

Tornadoes Associated with Tropical Storm Gabrielle

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Abstract

Together with the National Aeronautical and Space Administration (NASA) at the Kennedy Space Center, FL (KSC), the National Weather Service (NWS) at Melbourne, FL (MLB) recently configured a local adaptation of the Advanced Regional Prediction System (ARPS) Data Analysis System (ADAS) for short term forecasting to support hazardous weather operations. The ADAS was modified to assimilate nationally and locally available in-situ and remotely-sensed observational data into a series of high-resolution gridded analyses every fifteen minutes centered around east central Florida. In practice, ADAS output has been used to increase forecaster confidence regarding the manifestation of hazardous weather within the 0 to 6 hour time frame for threat assessment in local hazard outlooks and within the 0 to 60 minute time frame for local storm warnings. Using high resolution diagnostics has proven to be invaluable during difficult events, such as with tropical cyclone tornadoes.

On the morning of 14 September, 2001, four tornadoes struck Brevard County in east central Florida causing several swaths of damage. These tornadoes were associated with Tropical Storm Gabrielle which tracked west to east across the Florida peninsula from near Sarasota to Cape Canaveral. Three of the tornadoes were F0 on the Fujita scale, but one reached F1 intensity. Several homes and businesses were damaged, including a marina where parts of roofs were removed and many boats were picked up and tossed about. Confirming reports were received from area storm spotters and weather observers at Patrick Air Force Base. The tornadoes occurred within the preceding outer convection of Gabrielle, well ahead of the traditional wind and storm surge hazards. In the hours and moments leading up to the tornadoes, ADAS output was used to facilitate the assessment of the local tornado threat by revealing the evolution of various stability and shear parameters. This study will examine the utility of real-time high-resolution diagnostics during Gabrielle and its contribution to the local outlook/warning process. Subsequent recommendations will be made regarding optimum configuration and operational use during future tropical cyclone tornado events.

All NWS forecast offices recently acquired Warning Event Simulator (WES) workstations to allow simulated realtime playback and re-creation of past events. Forecasters will be able to use such scenarios to train for future events by performing analyses and making warning decisions in an environment as close to reality as possible. Data from the Brevard County Tropical Storm Gabrielle tornado event was used to create one such training scenario and will be available to other NWS offices to assist with local training. Examples from this package will

be shown to illustrate the utility of the WES for improving forecaster training.