

Improved Rainfall Predictions Pertaining to Land-falling Tropical Cyclone Gabrielle (2001) Based upon Ingest of High-Resolution Observational Data and MM5 Integrations

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Tropical Cyclone (TC) Gabrielle (2001) made landfall along the Southwest Florida coast on 14 September 2001. As Gabrielle moved northeast across the peninsula, localized (flash) flooding occurred across portions of central and northeast Florida, resulting in one fatality.

To examine potential improvements to short-term mesoscale forecasts resulting from the ingest of high resolution observational data from Central Florida, an MM5 integration was performed for a period of several hours beginning 1000 UTC September 14 2001. The outer 54-km grid was integrated from 0000 UTC 14 September using FNL data obtained from NCAR. Other grids were nested within, comprised of resolutions of 18-km, 6-km, and 2-km, covering proportionally smaller areas. Results from the inner 2-km grid were examined in detail for this study.

The presentation will focus upon the MM5 precipitation forecasts across Florida associated with TC Gabrielle during a 24 hour period beginning 0000 UTC 14 September. The model forecasts were made using two initial data sets; 1) a standard FNL data set over the entire United States; and 2) same as 1, except supplemented with high-resolution data at 4-km resolution across Central Florida. In addition, the integrations were performed using two different cumulus parameterization schemes. The results based upon the enhanced observational data set produced improved rainfall accumulations associated with the outer rain bands of the TC, relative to the standard data set integrations, and were comparable to totals recorded by area rain gages and estimates from the Melbourne WSR-88D. Further details of the project methodology and the high-resolution data set will be discussed, and comparisons will be made between the forecast and observed precipitation values.