Development of an Hourly-Updated NAM Forecast System and Application to the Damaging Summer 2012 Derecho Event

Jacob R. Carley[a], Geoff DiMego[b], Eric Rogers[b], Shun Liu[c], Brad Ferrier[c], Eric Aligo[c], and Matthew Pyle[b]

[a] *UCAR Visiting Scientist Program, USA, jacob.carley@noaa.gov,* [b] *NOAA/NWS/NCEP/EMC,* [c] *IMSG*

The June 29th, 2012 derecho event began over northwest Illinois as a developing mesoscale convective system at approximately 1500 UTC. By 1900 UTC this system had evolved into a bow echo over central Indiana and produced surface wind gusts as high as 91 mph. The storm maintained its damaging characteristics as it later moved southeastward through Ohio, West Virginia, Virginia, Maryland, and the Washington, D.C. metropolitan area by approximately 0300 UTC on June 30th.

This damaging event was generally not well-forecast by the operational 4 km CONUS-nest North American Mesoscale model (NAM), a property that became more problematic as the event approached. Therefore, this event has since served as a benchmark case for the ongoing development of an hourly-updated version of the NAM forecast system. Unlike the operational system, which updates every three hours, this hourly-updated system also cycles and updates the 4 km CONUS-nest in addition to the 12 km parent domain. Furthermore, a cloud analysis system has been introduced along with a twice-diabatic digital filter step to improve the initialization of cloud thermodynamic and hydrometeor fields. The digital filter not only helps to reduce noise in the early part of the forecast, but also applies a radar-derived latent heating tendency based upon the earlier cloud analysis step to help initialize the cloud fields. Also included are updates to the microphysics parameterization to improve both the forecast and representation of convective storms, storm structure, and storm attributes (e.g. strong surface wind gusts). Results of these tests with a focus on the 4 km CONUS-nest forecast of the derecho event from the hourly-updated NAM forecast system will be presented.