P2.14 Forecasting Convection over East Central Florida Using Near-Storm Scale Numerical Models within a Frequent Cycling Strategy
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During the Florida wet season, generally May through October, a daily forecast challenge is determining the location and timing of convection along coastal sea breezes and other mesoscale boundaries. For many years, National Weather Service (NWS) forecasters have had ready access to synoptic scale numerical models which provide depictions of larger features of meteorological interest and environments conducive for convective development. More recently, mesoscale models run at national centers, as well as within individual Weather Forecast Offices (WFOs), have provided enhanced predictions of convection and the mesoscale boundaries that can further support storm development. The Weather Research and Forecasting - Environmental Modeling System (WRF-EMS) has provided a full-featured and self-contained numerical weather prediction system that can be effectively configured and maintained within WFOs. Significant gains in forecasting the location and timing of convection can be attributed to the operational availability of local WRF-EMS forecast guidance.

With the advent of near turn-key modeling systems, such as the WRF-EMS, in tandem with advances in computing performance, numerical model output at finer spatial and temporal resolutions previously confined to national centers can now be achieved at field offices. During the summer of 2011, the NWS in Melbourne, FL, experimentally configured a model cycling strategy that produced rapidly updated WRF Non-hydrostatic Mesoscale Model (NMM) output every 60 minutes at 1km horizontal resolution having 5-minute temporal depictions. Each model run used the latest initial conditions and provided forecasters with fresh numerical guidance every hour extending out between 2 and 3 hours. The frequent cycling strategy was an attempt to better predict convective initiation and evolution in the very near term in hopes to accommodate increasing customer demands. The increased spatial and temporal resolution produced depictions of near-storm scale convective growth and associated wind fields. Subsequent inferences could be made about storm structure and the development and propagation of secondary boundaries.

During the experiment period, the WRF-NMM model was alternatively configured for comparison purposes. This included comparisons using different physics options. Limited cases were also run using the Advanced Research WRF core (ARW) having the Digital Filter Initialization (DFI) scheme implemented. The DFI attempts to mitigate a common challenge among numerical models whereby they often require an interval of time at the beginning of a cycle to stabilize and then ramp up convective development. The modeling system was also subjectively compared to a separate fuzzy logic system that uses various observational data, mesoscale model output, and human determined positions of low-level boundaries as weighted inputs.

Although the period of study was relatively short, some important comparisons are made between the various output guidance. These comparisons will be presented, along with operational insights for employing a local modeling strategy that involves frequent cycling in the attempt to better predict convection.