A Real-time Configuration of the ARPS Data Analysis System to Support Operational Forecasting in East-central Florida

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The National Aeronautical and Space Administration's Applied Meteorology Unit (AMU) configured the Advanced Regional Prediction System (ARPS) Data Analysis System (ADAS) to support operational short-range weather forecasting over east-central Florida, including the Kennedy Space Center and Cape Canaveral Air Force Station. 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. The goal for running ADAS over east-central Florida was to generate real-time analysis products that may enhance weather nowcasts and short-range (< 6 h) forecasts issued by the Spaceflight Meteorology Group (SMG) and National Weather Service at Melbourne, FL (NWS MLB). ADAS-generated grid analyses can provide forecasters with a tool to develop a more comprehensive understanding of evolving fine-scale weather features than could be obtained by individually examining the disparate data sources. In addition, graphical products derived from the analyses can be used by SMG forecasters to monitor flight rules during Space Shuttle operations, and by NWS MLB forecasters to generate and amend aviation products, fire-weather forecasts, and short-range forecasts.

Recently, a real-time version of ADAS was implemented at both SMG and the NWS MLB forecast offices. The real-time ADAS is run on two analysis grids with 10-km and 2-km horizontal grid spacing, respectively. ADAS uses the Rapid Update Cycle (RUC) 3-6 hour forecasts, linearly interpolated in time every 15 minutes, as a background field for the 10-km analyses. Subsequently, the 10-km analyses are spatially interpolated to provide a background field to the 2-km analyses. ADAS ingests nationally available surface and buoy observations, infrared and visible satellite brightness temperatures, and local observational data unique to east-central Florida including a meso-network of 47 KSC/CCAFS wind towers and six Doppler radar wind profilers. In addition, the ADAS at SMG ingests Level III Weather Surveillance Radar-1988 Doppler (WSR-88D) reflectivity and radial velocity products from the Jacksonville, Tampa Bay, Melbourne, and Miami radar sites, whereas the ADAS at the NWS MLB incorporates the full-volume, high-resolution, Level II WSR-88D data from the Melbourne

radar. Analyses are routinely available for examination between 10-15 minutes after the valid analysis time. These analyses are examined by forecasters at SMG and the NWS MLB using the GEMPAK Analysis and Rendering Program display software.

This presentation describes the process of configuring and implementing a real-time version of ADAS at both SMG and the NWS MLB. Examples of the operational utility of ADAS are shown for challenging short-range forecast situations. Ongoing efforts to improve the real-time ADAS include the incorporation of additional observational data sets such as Florida automated weather network surface agricultural observations and aircraft reports. In addition, Level III products from radar sites adjacent to Melbourne will be ingested into the ADAS at the NWS MLB, and Level II WSR-88D data from the Melbourne radar will be incorporated into the SMG ADAS. Finally, the ultimate goal is to initialize a high-resolution numerical weather prediction model with these ADAS analyses in order to develop a cycling scheme that preserves fine-scale features such as convective outflow boundaries within short-range numerical forecasts.