Sensitivity of MPAS to High-Resolution Terrain Data

Operational Centers that provide weather information to the Army will soon transition from WRF to the open-source MPAS modeling framework for regional-scale forecasting applications. As the Army's suite of geospatial terrain data becomes more precise, the ability to utilize high-resolution terrain datasets in weather modeling frameworks for regional-scale forecasting applications becomes increasingly important. This work supports the advancement of weather-informed decision support by investigating terrain initialization sensitivity in the MPAS NWP system to high-resolution (<1 km) land-surface input datasets. Incorporating <1 km resolution land surface data into MPAS has the potential to improve the accuracy of weather-informed decision support tools, but the effects of the interpolation of < 1 km resolution data onto the native MPAS mesh are not well understood. This presentation will provide an overview of preliminary findings in our efforts to quantify the sensitivity of MPAS-interpolated terrain parameters using higher resolution input data (<1 km) over the CONUS. Differences between the 3 km and <1 km results will be displayed to capture the improvements high-resolution input data could have on dynamic terrain understanding. Future efforts will work to quantify the potential improvements achieved in terrain-driven weather events when using Army's geospatial terrain data as input for MPAS simulations.