P40 Impact of WRF cumulus parameterization options on regional and fine-scale WRF-CMAQ simulations.

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The coupled WRF-CMAQ modeling system is a combined meteorology-chemistry model designed to simulate the emission, transport, and chemistry of atmospheric pollutants, while also allowing for direct aerosol radiative feedback between the meteorological model (WRF) and the chemical transport model (CMAQ) and frequent coupling of the meteorology and chemistry. For this work, we apply the coupled WRF-CMAQ modeling system at regional (i.e. 12-km) and fine-scales (i.e. 1-km and 4-km) using a variety of WRF/CMAQ options to assess the impact these options have on CMAQ simulated tropospheric ozone and particulate matter concentrations, with a particular focus on how changes in the WRF-simulated cloud fields affect these pollutants. The modeling system is used to simulate July 2011 for the contiguous United States using 12-km horizontal grid spacing, the eastern United States using 4-km grid spacing and the Baltimore, MD / Washington D.C. region using 1-km grid spacing, which was chosen since it coincides with the 2011 DISCOVERAQ intensive field campaign that provides additional measurements with which to evaluate the modeling system. Several different WRF cumulus parameterization (CP) schemes (and other cloud parameterization options) are employed in different configurations at the various resolutions, and the results of the simulations are evaluated against satellite cloud measurements, aircraft measurements, ozonesonde data, and ground-based in-situ observations to assess the performance of each configuration. Detailed results from these evaluations will be presented.