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Recent Advances in WRF-Chem/DART:
A Regional Chemical Transport/Ensemble Kalman Filter Data Assimilation System

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WRF-Chem/DART is a community resource for real time chemical weather data assimilation/forecast research that couples the Weather Research and Forecasting model (WRF) with online chemistry (WRF-Chem) and the Data Assimilation Research Testbed (DART). For this application, DART has been modified to include assimilation of *in situ* and remote/satellite observations of atmospheric composition. Currently, WRF-Chem/DART assimilates: (i) MOPITT partial and total column CO raw retrievals (RAWRs), quasi-optimal retrievals (QORs), and compact phase space retrievals (CPSRs), (ii) IASI partial and total column CO RAWRs, QORs, and CPSRs, (iii) IASI partial and total column O3 – under development, (iv) MODIS total column AOD retrievals, (v) AirNow in situ observations – under testing; and (vi) OMI total column NO retrievals – under testing.

WRF-Chem/DART also includes options for: (i) state variable localization to enable joint or independent assimilation of chemistry observations, and (ii) constrained emissions using the state augmentation method. Development of WRF-Chem/DART is a collaborative effort between NCAR/ACOM, NCAR/IMAGe, and various universities. This poster highlights some of its recent advances, which include:
(i) Extension of CPSRs from assimilation of full retrieval profiles to assimilation of truncated retrieval profiles (that enables discarding/not assimilating bad observations), (ii) Addition of an option for constraining emissions with the state augmentation method, (iii) Extension of the WRF-Chem/DART real time capability to dual-resolution cycling, and (iv) Comparison of WRF-Chem/DART assimilation/forecast results with independent observations.