Improving Air Quality (and weather) Predictions via Application of New Data Assimilation Techniques Applicable to Coupled Models

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ABSTRACT

Aerosol loading are high in large parts of Asia, with direct impacts on human health and on the Earth's weather and climate systems through their interactions with radiation and clouds. Their role is dependent on their distributions of size, number, phase and composition, which vary significantly in space and time. There remain large uncertainties in simulated aerosol distributions due to uncertainties in emission estimates and in chemical and physical processes associated with their formation and removal. These uncertainties lead to large uncertainties in weather and air quality predictions and in estimates of health and climate change impacts. Despite these uncertainties and challenges regional-scale coupled chemistry-meteorological models such as WRF-Chem have significant capabilities in predicting aerosol distributions and explaining aerosol-weather interactions. In this talk we explore the **hypothesis** that new advances in on-line, coupled atmospheric chemistry/meteorological models, and new emission inversion and data assimilation techniques applicable to such coupled models, can be applied in innovative ways using current and evolving observation systems to predictions of aerosol distributions at regional scales. We present results that show that the addition of geostationary data to other data sources, improves air quality predictions, and reduce uncertainties in health assessments and climate studies.