

Project Title: Study of Atmospheric Aerosols over National Capital Region, Delhi using Chemical Transport Model

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Most Indian cities are highly polluted with Respirable Suspended Particulate Matter (PM₁₀) and Fine Particulate Matter (PM_{2.5}) and have concentrations that are well above the air quality standards. In this context, atmospheric chemical models can play a pivotal role in the assessment of air quality and strategic planning for emission reduction. WRF-Chem is amongst one of the widely used Chemical Transport Model (CTM) that is useful in providing necessary framework for integration of our understanding of individual atmospheric processes and study of complex chemical interactions at various spatial and temporal scales. The main objectives of the proposed project are (i) to evaluate WRF-Chem model performance for its capability to simulate meteorological fields involving sensitivities towards various parameterization schemes, (ii) to simulate the aerosol distribution over Delhi NCR using WRF-Chem with sensitivity analysis towards different chemical mechanisms and performance evaluation thereafter using available in-situ observations, (iii) to quantify the relative contributions of various emission sources to total aerosol loading in Delhi NCR using different emission inventories with WRF-Chem. Application of meteorological model (WRF) followed by implementation and validation of WRF-Chem for aerosol studies are proposed. The work involves considering model sensitivities towards various atmospheric physical and chemical processes and different types of emissions.