NCAR | ATMOSPHERIC CHEMISTRY OBSERVATIONS & MODELING

Virtual ACOM/RAL Joint Seminar

Development of an Air Quality Early Warning System (AQEWS) for New Delhi

Rajesh Kumar
NCAR/RAL

Date: Monday, October 25th, 2021, 3:30pm – 4:30pm

Links: https://operations.ucar.edu/live-acom

ABSTRACT

Every winter, the National Capital Region (NCR) including New Delhi of India faces acute air pollution episodes characterized by fine particulate matter (PM2.5) exceeding 500 µg/m3. Such air pollution episodes severely affect the health and daily life of NCR residents. Thus, managing air quality with practical mitigation options has emerged as one of the top priorities of the Government of India (GOI) without compromising the current and projected growth of the economy, infrastructure development, industries, and service sectors. The GOI has launched several initiatives to improve air quality in the NCR such as strengthening of monitoring, advanced air quality forecasting, graded response action plan for temporarily controlling the emission sources, and five-year plans to incrementally reduce air pollution emissions. The GOI mandates required the Ministry of Earth Science (MoES) to develop an operational high-resolution air quality forecasting system for the NCR. In response to this mandate, we have developed an advanced air quality forecasting capability in close collaboration with the Indian Institute of Tropical Meteorology (IITM) and India Meteorology Department (IMD). NCAR led the development of the first version of the air quality forecasting system that assimilates MODIS AOD retrievals in the WRF-Chem model to improve aerosol initial conditions and implemented it operationally at the IITM in January 2019. This system was found to significantly improve air quality decision-making activity in Delhi by reducing biases in 72-h air quality forecasts 70-86%. These improvements are not only associated with the improved initialization but chemistry-weather interactions were also found to play a very important role especially during extreme PM2.5 episodes. Several new capabilities including extension of the forecasting system to 400 m grid spacing and 10-day lead time, analog-based post-processing of the air quality forecasts, and a decision support system have been added to this system over the last two years. In this talk, I'll provide a brief overview of the partnership between MoES and NCAR and development of different capabilities of the Delhi AQEWS.

For more information please contact Mary Anne Cervantes mcervant@ucar.edu, phone 303-497-1484.