

An integrated modeling and monitoring approach to forecast the air quality for a Mega City in Asia for Commonwealth Games-2010

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System of Air quality Forecasting And Research (SAFAR), a pilot project of GURME of World Meteorological Organization has been implemented in One of the most polluted Mega city Delhi of Asia during the Mega international sports event (CWG-2010) to provide location specific information on air quality in near real time and its forecast 24-48 hours in advance for the first time in India. The main objective was to understand the spatial distribution of major pollutants namely, ozone (O₃), oxides of Nitrogen (NO_x), Carbon monoxide (CO), Benzene, PM₁₀, PM_{2.5}, and Black carbon. To validate the forecasting and gain the confidence in model results, model results are compared with the dense network of observational network established on 11 locations in Delhi to measure the air quality and weather parameters under SAFAR. Scientific evaluation of the data generated from AQMS and WRF-CMAQ provided a basis to understand the air quality status of Mega city Delhi and identified the relative contribution of local sources and long range transport of pollutants. WRF-CMAQ simulations were performed for a four-level nested modeling domain, with nests covering South Asia at 45 km horizontal resolution to inner most domain of Delhi at 1.67 km resolution where newly developed high resolution emission inventories are used along with GMES monitoring atmospheric composition and climate (MACC) and GFS initial boundary conditions. The scatter plot of hourly observed PM₁₀ values with model prediction indicates a correlation coefficient of 0.57. Rainy activity before CWG-2010 resulted in low a PM₁₀ values which are well predicted by model. The contribution of unattended source of windblown dust from unpaved road in PM₁₀ is found to be substantial. The titration mechanism due to high level of NO_x is found to dominate in Delhi to keep the ozone at very low level. More exciting results and model skill will be presented.