Long-range transport of aerosols and their impact on the air quality of the Indo-Gangetic basin

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Indo-Gangetic (IG) basin is characterized by high aerosol optical depth (AOD) throughout the year (>0.4). During summer season, large increase in AOD (>0.6) is attributed primarily to long range transport of dust from Thar Desert (India), and arid and desert regions of Middle East and Africa as observed from various satellite, model results and ground observations. We have studied change in aerosol optical properties during major dust storm events of summer season (April-June) for the year 2005. Kanpur is located in the central part of IG basin, we have recorded six major dust events on 9 April, 9 May, 13 May, 3 June, 10 June, and 14 June 2005. We have used AERONET, MODIS (Moderate Resolution Imaging Spectroradiometer) and CPCB (Central Pollution Control Board) data to characterize dust storms, path, spatial extent and change in aerosol optical properties. Kanpur AERONET (level 1.5) data shows AOD (500nm) and Angstrom exponent in the range 0.8-1.25 and 0.1-0.3 respectively during dust events. Aerosol size distribution data indicates dominance of medium to coarse mineral dust aerosols compared to finer particles with a peak in the 1-7μm range during these event days. The aerosol parameters retrieved from MISR and MODIS, and also AERONET show presence of mineral dust aerosols. Spectral variations of AOD have been studied during dust event days. Hybrid Single-Particle Lagrangian Integrated Trajectory (HYSPLIT) transport model have been used to trace source and path of these dust storms (5 day back-trajectory). Detailed discussion about the monitoring and characterization of dust events and effect on air quality will be discussed.