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Satellite Sensor and Ground Based Observations of a Dust Storm over India

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Aerosols are considered to be important in the Earth's radiation budget due to their scattering and absorbing properties, which perturb the solar and terrestrial radiation. Recent studies have shown that, a significant proportion of mineral dust in the atmosphere has an important role on climate change. Severe dust storm occurred during 1 st week of May 2003 in the northern region of India, which spread substantially. The present study examines the change in aerosol properties at Hyderabad during this period. Aerosol optical depth was measured using a multi wavelength radiometer (MWR) and the size distribution of aerosols was measured using a Quartz Crystal Microbalance Impactor (QCM) Particle Analyser. The results of the study indicated high Aerosol Optical Depth (AOD) during the dust storm period with increase in coarser mode particles. IRS-P4 satellite sensor data sets showed the extent of the spread of the dust storm over land regions and EP-TOMS Aerosol Index (AI) data showed high values of aerosol index during the dust storm period. National Oceanic Atmospheric Administration (NOAA) Hybrid Single-Particle Lagrangian Integrated Trajectory model (HYSPLIT-4) analysis of air mass suggests that the aerosol plume coming from the dust storm event of north Indian affected the aerosol loading over the study area. Average ground reaching solar irradiance at 500nm decreased by ~100W/m^2 on 3rd May compared to pre and post dust storm period. A decrease in ground reaching solar irradiance was observed. The results are discussed in the paper.

Keywords: Aerosol Optical Depth, Aerosol Index, Solar Irradiance, Dust Storm