**Assessing physical and optical properties of aerosol over subtropical site in India**

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The present study assesses the physical and optical properties of aerosol over Agra in the Indo-Gangetic basin region during April 2018 to March 2019 in Agra. The mean concentration of PM10 (252 μg m-3), PM2.5 (106.9 μg m-3), PM­1 (49.2 μg m-3), BC (10.6 μg m-3) and AOD (0.63) has been determined. The mean AOD at 340 nm, 400 nm, 450 nm, 500 nm, 600 nm, 650 nm, 750 nm, 850 nm, 935 nm and 1020 nm is 0.52, 0.45, 0.66, 0.63, 0.57, 0.52, 0.67, 0.39, 0.37, and 0.51, respectively. The concentration of PM10 and PM2.5 is 2-3 times higher than the NAAQS standard and 7-8 times higher than the WHO standard. The high load of aerosol may be due to excessive vehicular emissions and road paved dust. The concentration of BC is highest during winter (19.2 µg m-3), followed by summer (7.6 µg m-3) and monsoon (5.6 µg m-3) season. In winter season Agra is characterized by the low temperature and high relative humidity which may be resulted in the high loading of black carbon due to biomass burning. The mean absorption angstrom exponent (αabs) was 1.3 at a shorter wavelength. It indicates the dominance of diesel exhaust (fossil fuel) as well as biomass burning in the present study site. The contribution of BC with fossil fuel (BCff) and biomass (BCbb) was 25 %, 35 %, and others are 37 % during the study period. The mean spectral variation shows high AOD at the lower wavelength and low at a higher wavelength. The spectral variation of aerosol optical depth is showing relatively strong wavelength dependencies of optical depth at shorter wavelengths that generally decreases towards longer wavelengths irrespective of the seasonal change.