

Carbonaceous Aerosol at Breathing Height during Wintertime in Ambient Atmosphere of National Capital Region (NCR) of Delhi, India

A. Rathee¹, S. Yadav^{1*}

¹School of Environmental Sciences, Jawaharlal Nehru University, New Delhi- 110067

Size distribution, water-soluble organic carbon (WSOC), water-soluble inorganic carbon (WSIC), organic carbon (OC), and elemental carbon (EC) in fine particles (PM_{2.5}) were investigated at breathing height (~2m) during winter 2017 over Rohtak, Haryana (RTK) and Karol bagh, New Delhi (NDK). The average mass concentration of fine particles exceeded the Indian National Ambient Air Quality Standard (NAAQS: 60 µg m⁻³ for 24 hours) over RTK (5.6 times) and NDK (4.8 times). The WSOC in fine particles was 39.14 and 21.21 µgm⁻³ over RTK and NDK, respectively. The WSOC/OC was 0.8 in RTK and 0.6 in NDK, which suggests the formation of photochemical haze in the suburban atmospheric environment and the impact of biomass burning in the study area. At both sites, OC dominates over EC. The total carbon (TC = OC+ EC) concentration was 73.47 µgm⁻³ and 57.57 µgm⁻³ over RTK and NDK, which was 21.7% and 19.8% of the total PM_{2.5} load of both the sites, respectively. OC and EC concentration over RTK was 47.61 µgm⁻³ and 25.86 µgm⁻³, and over NDK, was 32.65 µgm⁻³ and 24.92 µgm⁻³, respectively. Among the four organic carbon fractions, OC1 comes from biomass burning, OC2 from coal combustion, OC3, and OC4 from road dust, whereas, in three elemental carbon fractions EC1 comes from motor vehicle exhaust, and EC2, and EC3 from the high-temperature combustion process.