

A Synoptic Study of Aerosol over the Metropolis Area of the Ganges Delta during Winter and Summer Monsoon

A.Chatterjee¹, C.Dutta¹, D. Ganguly², T. K. Jana² and S.Sen¹

¹*Department of Chemistry, Calcutta University, 92, A.P.C. Road, Kolkata-700 009, India*

²*Department of Marine Science, Calcutta University, 35, B.C.Road, Kolkata-700019, India*

A comprehensive study on the chemical characterization of fine particulate matter (PM_{2.5}) was carried out over metropolis area of the Ganges delta, India during January to December, 2005 covering summer and winter monsoon. An average concentration of PM_{2.5} was found to be $76.18 \pm 36.1 \mu\text{g m}^{-3}$ ranging between $36.9 \mu\text{g m}^{-3}$ and $156.5 \mu\text{g m}^{-3}$ with maximum value during peak winter monsoon. NO₃⁻ and SO₄²⁻ were the most abundant water-soluble species and aerosol was acidic in nature. Carbonaceous matter was the largest single fraction of the total PM_{2.5} and even higher than that of the composite of major water-soluble ions. OC/EC ratio was used as a tracer to quantify the primary and secondary nature of organic carbon. Some toxic heavy metals were found to be accumulated in particulate matter among which Pb, Cd and Zn were found to be present as anomalously enriched elements (AEE) and Fe, Al, Cr and Mn as non enriched elements (NEE) in both the sites. Aerosol transportation from two major source regions (from northeast and northwest continental parts of Asia and from southeast and southwest Arabian Sea and Bay of Bengal) were identified for the transportation of aerosol using HYSPLIT (NOAA/ARL) model during winter and summer monsoon.

Keywords: Fine particulate matter; Kolkata; Anthropogenic aerosol; Carbonaceous aerosol.