AOGS 2005

Estimation of some of the Heavy Metals in Size-Fractionated Urban Aerosols around Kolkata, using Chemical Mass Balance Modelling

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The major objective of this work was to collect aerosol samples from various urban locations in and around Urban Kolkata in various size fractions. These samples were then tested for the morphology using Scanning Electron Microscopy (SEM) and then the Elemental Composition was determined for specific trace metals using atomic absorption spectroscopy. These data sets were used as inputs to a chemical mass balance source apportionment model. Simultaneous measurements of wind speed, direction temperatures (dry and wet bulb) were done.
Size fractionated particulates (in the range of approximately 10 μm to 0.7 μm) were sampled using a KIMOTO CPS-105 (5-STAGES) Sampler at four (4) urban background sites in and around various municipal as well as usage zones of KOLKATA. The samples were physically characterised using Scanning Electron Microscopy (SEM) which provided information on the shape and size of the particles along with some elemental information using Atomic Absorption Spectrometry (AAS). Six metals namely- Cd, Cr, As, Hg, Pb and Ni were analysed by AAS for each size fraction after acid digestion. A chemical Mass Balance Model (US-EPA's CMB-Version 7.0) was used to apportion the sources.

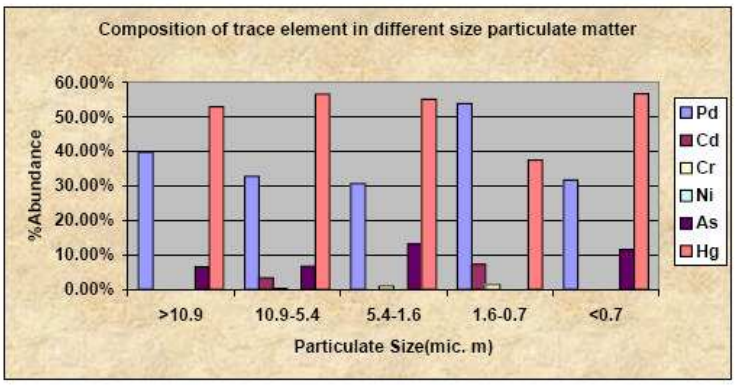

Figure 1: Research results