

Chemical Composition of Atmospheric Aerosols at Different Geographic Environments Over India

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Atmospheric aerosols originate from a variety of sources and production mechanisms. This induces significant spatial and temporal heterogeneities in their physical and chemical properties. The radiative, environmental /biological effects of aerosols depend on their chemical composition as well as concentration levels of different chemical species. However comprehensive data on the chemical composition of aerosols on regional scales are scarce. This paper presents the results of the studies on the aerosol mass loading and chemical composition of aerosols collected from three locations in India, which exhibit distinctly different geographical and environmental features. One site was Trivandrum (8.53°N 76.88° E) a coastal location near the southern tip of Indian peninsular region near Arabian Sea. The other two were inland locations, one Hyderabad an urban location and other Kharagpur, a rural site in north India. The aerosol samples are collected using a single stage high volume aerosol sampler with quartz fibre filter as the collection medium. The samples are analysed for anions (SO₄, NO₃, PO₄ and Cl) and NH₄ using Ion-Chromatograph and for cations of Na, K, Mg, Ca, Cu, Fe, Zn, Mn, Pb etc using AAS/ICP-AES. The aerosol mass loading and chemical composition measured at these sites are inter-compared with those over the oceanic environments. Based on chemical composition, source characterization of aerosols is also attempted. Irrespective of site, SO₄ is found to be a major component in all the samples. While coastal location Trivandrum shows abundance of sea salt ions like Na and Cl during monsoon months, inland sites showed significant mass concentration of crustal components. Oceanic environments are characterized by the presence of continental aerosols owing to transport from adjacent landmass.