

Long Term Changes of Aerosols and Their Radiative Forcing over the Tropical Urban Station Pune, India

Authors : M. P. Raju, P. D. Safai, P. S. P. Rao, P. C. S. Devara, C. V. Naidu

Abstract : In order to study the Physical and chemical characteristics of aerosols, samples of Total Suspended Particulates (TSP) were collected using a high volume sampler at Pune, a semi-urban location in SW India during March 2009 to February 2010. TSP samples were analyzed for water soluble components like F, Cl, NO₃, SO₄, NH₄, Na, K, Ca, and Mg and acid soluble components like Al, Zn, Fe and Cu using Ion-Chromatograph and Atomic Absorption Spectrometer. Analysis of the data revealed that the monthly mean TSP concentrations varied between 471.3 µg/m³ and 30.5 µg/m³ with an annual mean value of 159.8 µg/m³. TSP concentrations were found to be less during post-monsoon and winter (October through February), compared to those in summer and monsoon (March through September). Anthropogenic activities like vehicular emissions and dust particles originated from urban activities were the major sources for TSP. TSP showed good correlation with all the major ionic components, especially with SO₄ (R= 0.62) and NO₃ (R= 0.67) indicating the impact of anthropogenic sources over the aerosols at Pune. However, the overall aerosol nature was alkaline (Ave pH = 6.17) mainly due to the neutralizing effects of Ca and NH₄. SO₄ contributed more (58.8%) to the total acidity as compared to NO₃ (41.1%) where as, Ca contributed more (66.5%) to the total alkalinity than NH₄ (33.5%). Seasonality of acid soluble component Al, Fe and Cu showed remarkable increase, indicating the dominance of soil source over the man-made activities. Overall study on TSP indicated that aerosols at Pune were mainly affected by the local sources.

Keywords : chemical composition, acidic and neutralization potential, radiative forcing, urban station

Conference Title : ICSRD 2020 : International Conference on Scientific Research and Development

Conference Location : Chicago, United States

Conference Dates : December 12-13, 2020