Dry deposition: A major pathway of atmospheric dust particle deposition

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Acidic deposition is of major concern due to their detrimental effects including wide spread acidification of soil, ponds, lakes, corrosion of building materials, injury to vegetation etc. The major mechanisms of removal of pollutants from the atmosphere to earth surface are dry deposition, wet deposition and occult deposition. Dry deposition is an important process for Indian climatic conditions as dry conditions prevail for most part of the year while rains are confined to short monsoon period. Direct measurements of dry deposition on natural surfaces are significant because measurements made so far are on surrogate surfaces that do not simulate the natural surfaces. Dry deposition flux was higher on rougher surface of Cassia leaf comparison to leaf of Ashok because it prevented the re-entrainment of deposited particles and therefore has higher deposition flux. Contribution of alkaline components is higher towards total dry deposition and hence dry deposition is basic in nature, which is dominated by the soil-derived elements Ca^{2+} and Mg^{2+}. NH_4^+ also plays important role in neutralization. Three major sources responsible for dry deposition of major ions are combustions for F^-, Cl^-, NO_3^-, SO_4^{2-} and K^+, road dust/soil for Ca^{2+}, Mg^{2+} and NH_4^+ and brick-kiln industries for Na^+ and F^+. The deposition velocities are relatively larger for cationic species than anionic species probably because the soil-derived aerosols (Na^+, K^+, Ca^{2+}, and Mg^{2+}) have higher MMDs.

Integrated GIS approach for characterisation of hydrogeochemical processes governing the groundwater quality in Sabarmati basin, Gujarat, India

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Factors influencing the groundwater hydrochemistry in pre and post monsoon season were evaluated for a part of Sabarmati river basin of Gujarat, a hub of intense growth of agricultural and industrial activities. Samples were collected on the basis of spectral signature of vegetation and soil as observed on satellite image. 14 water quality parameters were analysed which formed the attribute database for spatial variation of respective parameter using GIS. Graphical plots were used to decipher the hydrogeochemical process occurring in the study area. Gibbs plot, USSL diagram, % sodium and SAR were used to verify the suitability of groundwater for irrigation. It was observed that leaching of wastes disposed from anthropogenic activities and agrichemicals is the major factor along with the natural processes such as weathering, dissolution and ion-exchange. Control of indiscriminate and unplanned exploitation of groundwater, application of fertilizers and disposal of industrial wastes in the affected areas can possibly ensure groundwater protection from further pollution and depletion.