

ABSTRACT.

Fog is a recent phenomenon in Northeastern Pakistan since last three winters which results in massive economic loss by paralyzing transport system nationwide. The analysis of fog samples for SO_4^{2-} , NO_2^- , NO_3^- , Cl^- , Fe, Zn, Cu, Ni, Cr, As, and Cd (by UV-Visible and Atomic Absorption Spectrophotometric Methods) was carried out. The results show the extremely high concentration of sulphate ions acting as Fog Condensation Nuclei (FCN). The aerosol particle growth of sulphate ion was due to SO_2 conversion to Gaseous Sulfuric Acid (GSA), and homogeneous bimolecular nucleation of GSA and water vapors leading to formation of sulphate ions. The high concentration of SO_4^{2-} in samples collected from urban areas (as compared to rural areas) pleads the validity of fact. The concentrations of NO_3^- , and NO_2^- ions was due to Gas-Phase production of HNO_3 and HNO_2 via photochemical conversion of NO and NO_2 , facilitated by formation of Ozone through Chapman cycle. The daily fluctuations of ions shows that the trace metal concentrations have a critical influence on the kinetics of the catalyzed reactions and also on the global oxidation schemes in the atmosphere responsible for formation of atmospheric aerosols under study.