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Long Term Monitoring and Assessment of Atmospheric Aerosols in Indo-Gangetic Region of India

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Abstract : The long term sampling at one of the most populated city in Indo-Gangetic region shows higher mass concentration of atmospheric aerosol ($PM_{2.5}$) during spring season (144.70µg/m³), summer season (91.96 µg/m³), the autumn season (266.48µg/m³) and winter season (367.09 µg/m³) respectively. The concentration of $PM_{2.5}$ in Patna across the year shows much higher than the limit fixed by the national ambient air quality level fixed by central pollution control board India (CPCB, India) and World Health Organization (WHO). Different water-soluble cation (Na^+, K^+, Ca^{2+}, NH_4^+ , and Mg^{2+}) and anion (Cl^-, NO_3^- , and SO_4^{2-}) species were detected in $PM_{2.5}$. Results show the significantly higher loaded of water-soluble ions during winter and spring seasons. The acidity of the atmosphere was revealed and calculated using selected major cations (K^+, Ca^{2+} , and NH_4^+) and anions (SO_4^{2-}, and NO_3^-). A regression correlation was analyzed to check the significant linkage between the acidity and alkalinity ions. During the winter season ($r^2 = 0.79$) and spring season ($r^2 = 0.64$) shows good significant correlation between the cations and anions. The ratio of NO_3^-/SO_4^{2-} indicates the sources of secondary pollutants were mainly influenced by industrial and vehicular emission however SO_4^{2-} mostly emitted from industries during the winter season.

Keywords : aerosols, inorganic species, source apportionment, Indo-Gangetic region
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