

Rainwater quality from 1983 to 2005 and during pre-monsoon and post-monsoon periods in Visakhapatnam, India: a measure of industrial development

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Abstract Rainwater quality has become an increasing environmental concern for developing nations. The contributions of industrial operations, embedded into various components of the hydrological cycle, affect water quality. A study on the time series of rainwater quality from Visakhapatnam, located on the east coast of India, has revealed the impact of atmospheric pollutants originating from industry. Industrial growth effects on rainwater quality were evaluated. An important observation is that rainwater salinity is higher in the pre-monsoon months of February, March, April, May and June than in the monsoon and post-monsoon months of July, August, September, October, November and December. Electrical conductivity of rainwater increased from 1983 to 2005 and pH decreased. Furthermore, trends in Cl^- , SO_4^{2-} , NO_3^- , NH_4^+ , and Ca^{2+} concentrations and the concentration ratio of $\text{SO}_4^{2-} + \text{NO}_3^-$ to $\text{NH}_4^+ + \text{Ca}^{2+}$ reflect the increasing threat of acidic atmospheric deposition in the region.

Key words monsoon; industrial operations; aerosols; precipitation scavenging; wash-out; acid rain; India