

Temporal variation of Potassium in PM_{2.5} aerosols and backward trajectory analysis at Central Delhi, India

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Keywords: Fine particulate (PM_{2.5}), Backward trajectory analysis, Seasonal variation, Potassium, Biomass burning

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Abstract

K⁺ has been considered as a biomass marker in the atmosphere (Kulshrestha et al., 2001; Nair et al., 2006; Pachon et al., 2013). In this study, the levels, seasonal variation and the transport of K⁺ in PM_{2.5} aerosols have been observed for the year 2011. The mean concentration of K⁺ in PM_{2.5} aerosols has been observed the highest in post monsoon season. The enhanced levels of K⁺ during post monsoon season might be due to shifting of boundary layer and increased anthropogenic activities. In addition, significant amount of biomass burning (slash burning) takes place in the Punjab, Haryana and Western UP during this season. As K⁺ is also generated from burning of vegetative scrap (Kundu et al., 2010), this further contributes more K⁺ in to the atmosphere. In addition the calm wind conditions during post monsoon season might have suppressed the dispersion of K⁺, resulting in its enhanced levels during this period (Fig. 1). Low mean concentrations were observed for summer and monsoon period which may be attributed to high wind speeds and frequent wash out during respective seasons. The high concentration of K⁺ during night time has been found in all seasons (Fig.1).

Backward air trajectory analysis revealed the majority of air masses during post monsoon season coming from NW regions of Punjab and Haryana, which are considered as the regions for the burning of crop residue (Fig. 2). These areas might contribute to the enhanced levels of K⁺.

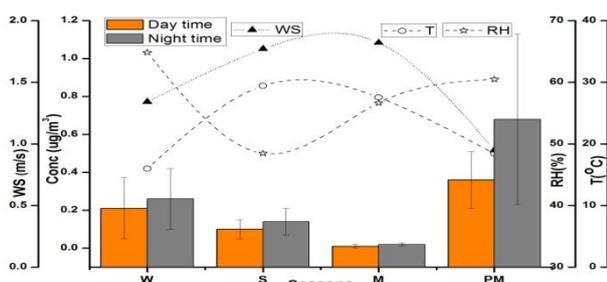


Figure. 1. Seasonal variation of K⁺ in PM_{2.5} with meteorological parameters

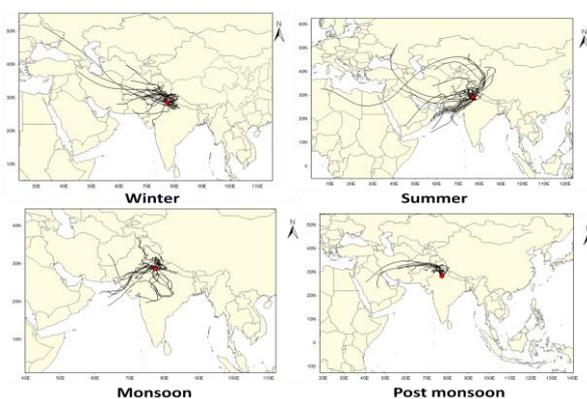


Figure.2. Backward air trajectory analysis for different seasons.

Acknowledgements

Authors are grateful to the Director, CSIR-NPL for his encouragement and Head, RASD for providing facilities to carry out this research work. CSIR fellowship to Subhash Chandra, SRF is gratefully acknowledged.

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