



## Measurements of aerosol and trace gases at Agra in Indo-Gangetic plain during special aerosol land campaign II

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This paper deals with measurements of aerosol, their chemical properties and precursor trace gases at Agra in the Indo-Gangetic plain during ISRO-GBP special aerosol land campaign II. Aerosol and trace gas sampling as well as meteorological parameters monitoring were carried out at Dayalbagh, a suburban site of Agra during campaign in December 2004 along with seven other stations in India. The average TSPM level was  $441.2 \mu\text{g m}^{-3}$  and ranges between  $60.8 \mu\text{g m}^{-3}$  and  $1004.6 \mu\text{g m}^{-3}$  and was higher than National Ambient Air Quality Standard values of India. The high load SPM in this region may be probably due to industrial-vehicular emissions of sulphur and nitrogen oxides, transport of soil-sand dust from local agricultural field and Thar Desert of Rajasthan and long range transported pollutants. Meteorological study revealed that high wind speed and wind from North West direction influences the aerosol load as it may be long range transported. TSP load was higher during initial foggy and foggy days and lower during post foggy days.  $\text{NH}_4^+$  concentration is highest followed by  $\text{NO}_3^-$ ,  $\text{SO}_4^{2-}$ ,  $\text{Cl}^-$ ,  $\text{K}^+$ ,  $\text{Ca}^{2+}$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$  and  $\text{F}^-$ . The high concentration of  $\text{NH}_4^+$  may be probably due to nearby cattle yard, use of fertilizers and biogenic emissions. The concentration of trace gases  $\text{SO}_2$ ,  $\text{NO}_2$ ,  $\text{HNO}_3$  and  $\text{NH}_3$  are  $20.8 \mu\text{g m}^{-3}$ ,  $26.3 \mu\text{g m}^{-3}$ ,  $1.6 \mu\text{g m}^{-3}$ ,  $18.6 \mu\text{g m}^{-3}$ , respectively. The transportation of urban plumes may be responsible for high concentration of  $\text{SO}_2$  and  $\text{NO}_2$ .  $\text{HNO}_3/\text{NO}_3^-$  ratio is less than unity.  $\text{NO}_3^-$  and  $\text{NO}_2$  ( $r=0.4$ ) suggests formation of particulate  $\text{NO}_3^-$  from  $\text{NO}_2$ . Ratio of  $\text{NH}_3/\text{NH}_4^+$  is less than unity.  $\text{SO}_4^{2-}/\text{SO}_2$  ratio is 0.84. The lack of correlation between  $\text{SO}_4^{2-}$  and  $\text{SO}_2$  ( $r = 0.14$ ) indicates only a small fraction of  $\text{SO}_4^{2-}$  is contributed by  $\text{SO}_2$  while the major fraction is contributed by soil and other sources probably long range transported sulphate.