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## Scattering and absorption characteristics of aerosols at an urban megacity over IGB:

### Implications to radiative forcing

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### Abstract

Aerosol scattering and absorption characteristics were investigated at an urban megacity Delhi in the western Indo-Gangetic Basin (IGB) during the period from October 2011 to September 2012 using different in-situ measurements. The scattering coefficient ( $\sigma_{sp}$  at 550 nm) varied between 71 and 3014  $Mm^{-1}$  (mean  $\sim 710 \pm 615 Mm^{-1}$ ) during the entire study period, which was about **ten** times higher than the absorption coefficient ( $\sigma_{abs}$  at 550 nm  $\sim 67 \pm 40 Mm^{-1}$ ). Seasonally,  $\sigma_{sp}$  and  $\sigma_{abs}$  were substantially higher during the winter/post-monsoon periods, which also gave rise to single scattering albedo (SSA) by **~5%**. The magnitude of SSA (at 550 nm) varied between **0.81 and 0.94** (mean: **0.89 $\pm$ 0.05**). Further, the magnitude of scattering Ångström exponent (SAE) and back-scattering Ångström exponent (BAE) showed a wide range from -1.20 to 1.57 and -1.13 to 0.87, respectively which suggests large variability in aerosol sizes and emission sources. Relatively higher aerosol backscatter fraction ( $b$  at 550 nm) during the monsoon ( $0.25 \pm 0.10$ ) suggests more inhomogeneous scattering, associated with the coarser dust

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