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PII: S0169-8095(17)31113-4
DOI: https://doi.org/10.1016/j.atmosres.2018.01.018
Reference: ATMOS 4172

To appear in: *Atmospheric Research*

Received date: 26 October 2017
Revised date: 17 January 2018
Accepted date: 30 January 2018

Please cite this article as: A.K. Srivastava, D.S. Bisht, Sachchidanand Singh, N. Kishore, V.K. Soni, Siddhartha Singh, S. Tiwari , Scattering and absorption characteristics of aerosols at an urban megacity over IGB: Implications to radiative forcing. The address for the corresponding author was captured as affiliation for all authors. Please check if appropriate. Atmos(2017), https://doi.org/10.1016/j.atmosres.2018.01.018

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 (σ_{sp} **at 550 nm)** varied between 71 and 3014 Mm^{-1} (mean ~710±615 Mm^{-1}) during the entire study period, which was about **ten** times higher than the absorption coefficient (σ_{abs} **at 550 nm ~67±40** Mm^{-1}). Seasonally, σ_{sp} and σ_{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±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±0.10) suggests more inhomogeneous scattering, associated with the coarser dust