High-Resolution Size Distribution of Organic Aerosol in Indo-Gangetic Plain.

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Introduction

- Interfering isobaric species?
- Growth rate of HR fragments and UMR proxies?

High Resolution Particle Time of Flight (HR-PToF)
Size distribution of OA

OA sources derived from Positive matrix factorization (PMF) using PMF evaluation tool (PET, Version 2.06)

Evolution of size and composition of OA

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Temporal variation of the mass and size distributions of the PM$_1$ non-refractory species (OA and inorganics).

2016


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HR size distributions of SVOOA (m/z 43), COA (m/z 55) and HOA proxies (m/z 57)

UMR size distributions of (a) SVOOA (m/z 43), (c) COA (m/z 55) and (e) HOA (m/z 57) proxies (top row) and the respective binned HR size distributions (b, d and f).
HR size distributions at LVOOA (m/z 44) and BBOA (m/z 60 & 73) proxies

UMR size distributions of LVOOA (m/z 44) and BBOAs (m/z 60 & 73) and the respective binned HR size distributions

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Diurnal variation of PM$_1$ distribution in Kanpur, derived from Scanning mobility particle sizer (SMPS)

(a) : Diurnal variation in the number concentration and MMD of number and surface area distribution derived from SMPS.
(b), (c) and (d) : Diurnal variation of number, surface area and volume distribution of PM$_1$ species derived from SMPS.

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Evolution of aerosol size and composition of OA and PM$_1$ in Kanpur using size-resolved analysis of high-resolution aerosol mass spectra.

Diurnal variation of the Mean Modal Diameter (MMD) and Mass concentration of HR organic proxies and inorganic species. Figure d indicates the diurnal variation of PMF factors derived from HR-PMF analysis.

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Conclusions

- Distinct externally mixed primary and secondary aerosol particles are observed in the mornings, evenings, and nights when photochemistry does not take place.

- The growth rate of primary OA family is different from that the secondary OA families.

- The increase in the mode of the primary species with increase in secondary organic loading during the middle of the day suggest that the observed particle growth is primarily influenced by the condensation of oxidized organic species produced by in-situ photochemistry.

- This condensational growth results in externally mixed primary aerosols becoming internally mixed with secondary species diurnally within the timescales of a few hours.