

*Supplement of*

## **Characterization and source apportionment of organic aerosol at 260 m on a meteorological tower in Beijing, China**

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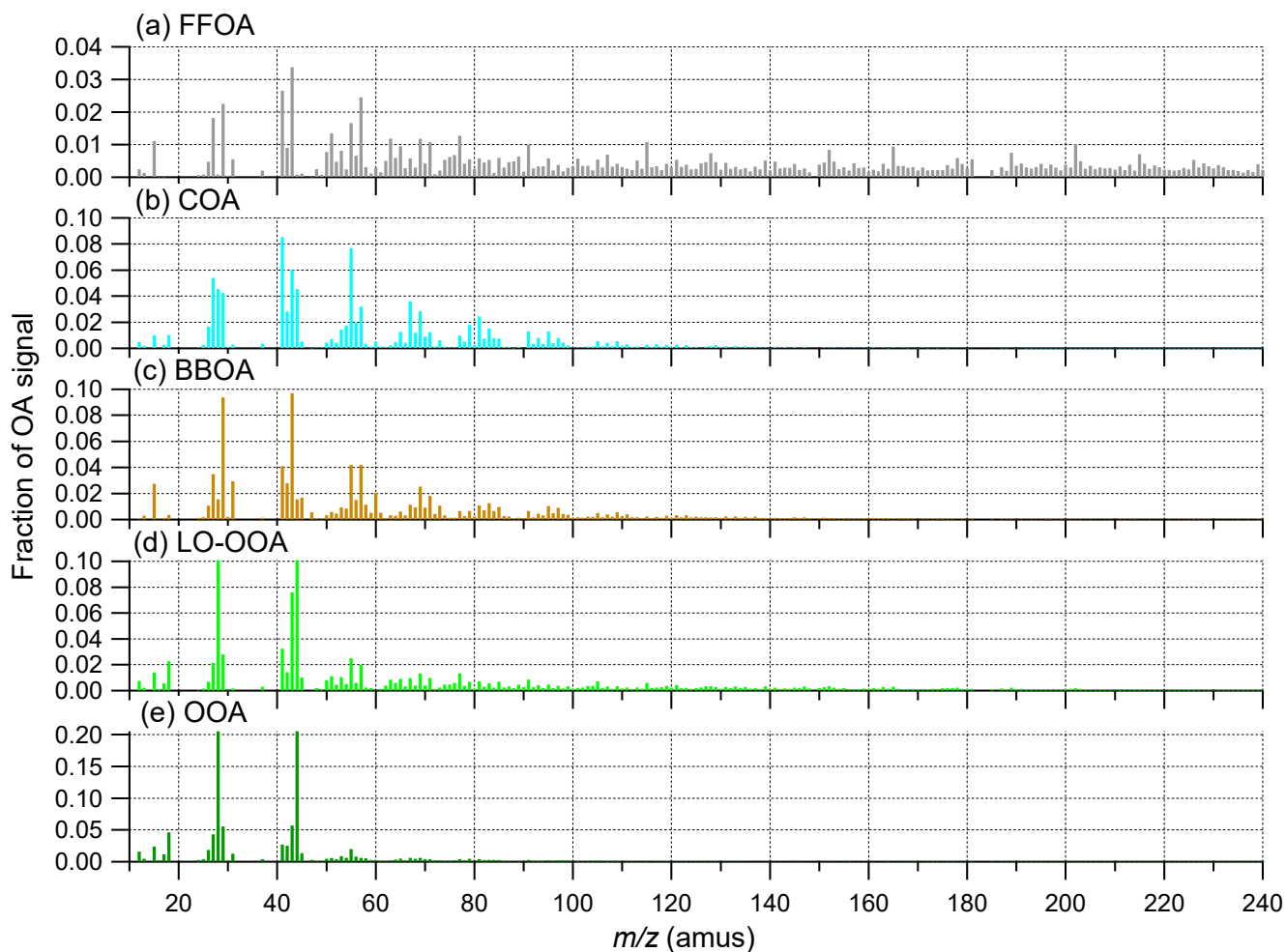
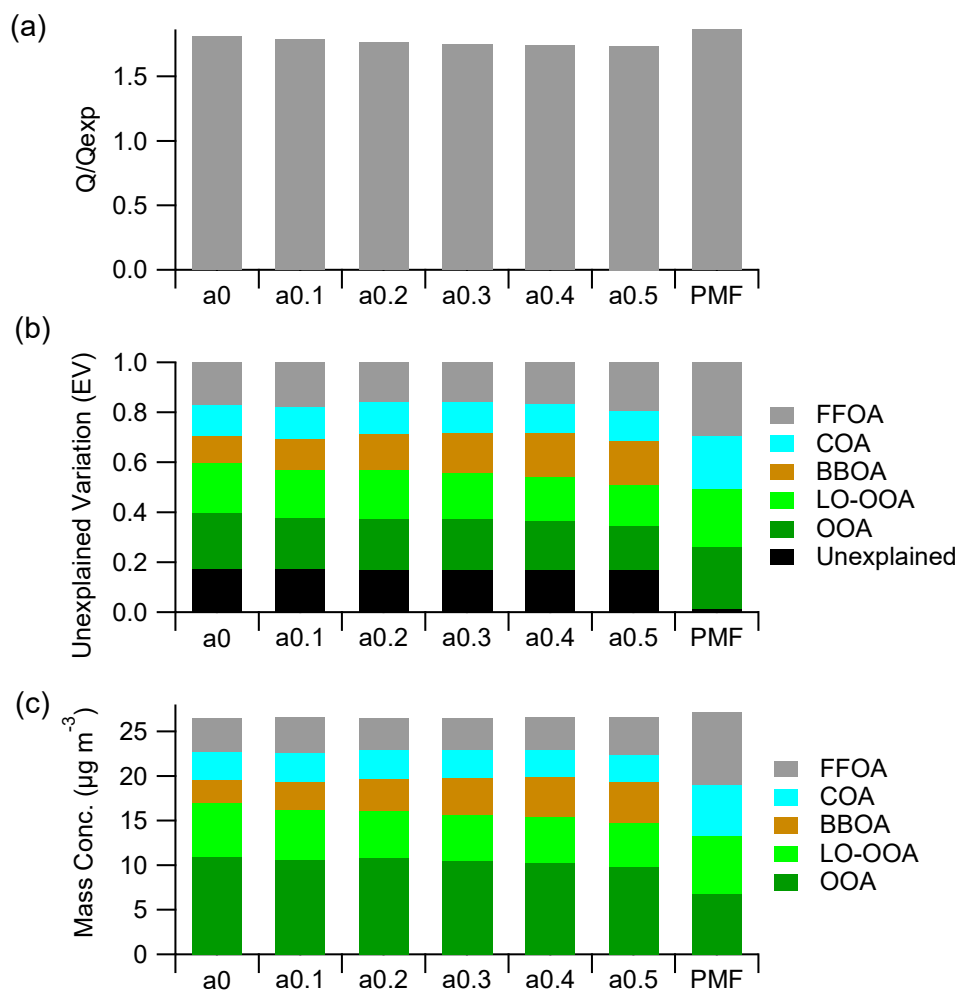
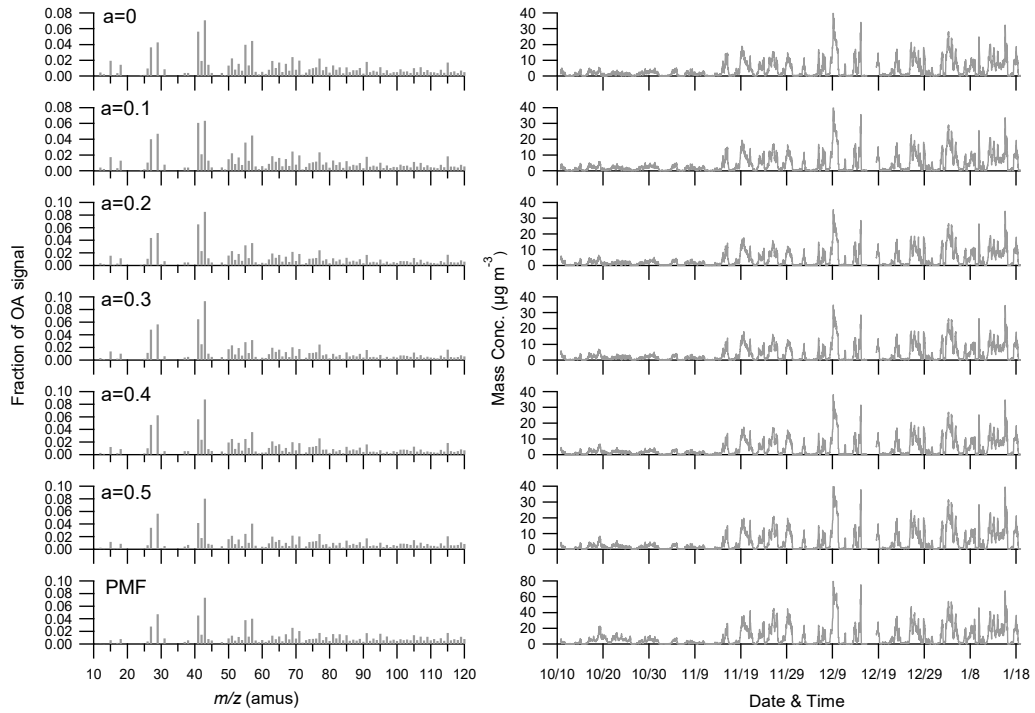


Figure S1: Mass spectra of five organic aerosol (OA) components resolved at the ground by HR-AMS using positive matrix factorization (PMF): (a) fossil fuel-related OA (FFOA), (b) cooking OA (COA), (c) biomass-burning OA (BBOA), (d) low-oxidized oxygenated OA (LO-OOA), and (e) oxygenated OA (OOA).

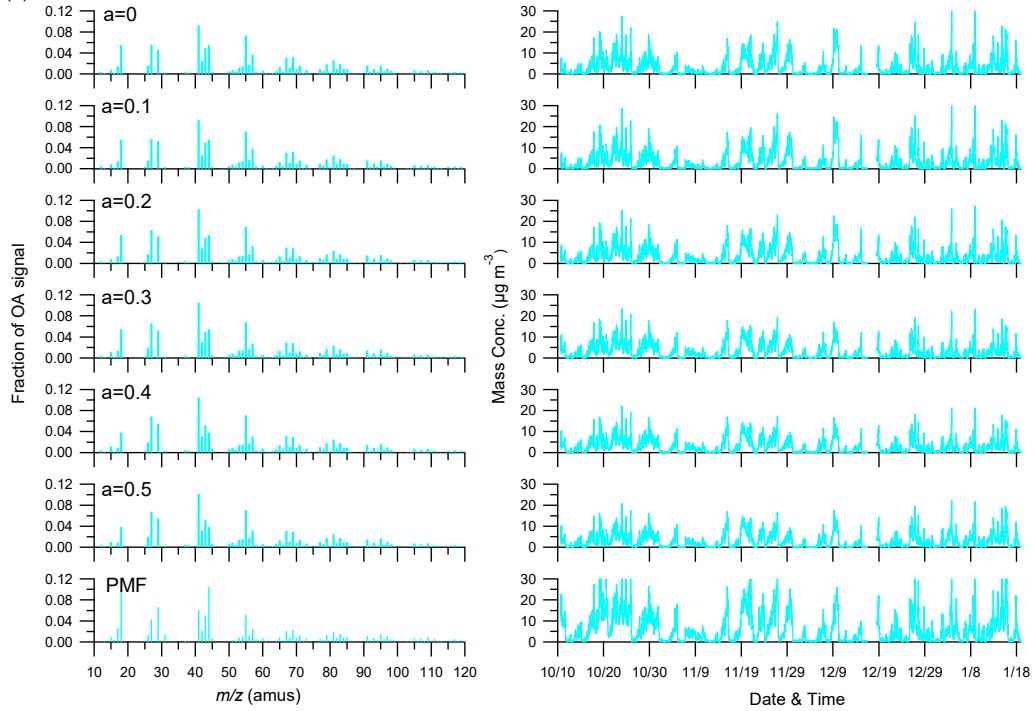


**Figure S2: (a) Values of  $Q/Q_{exp}$ , (b) explained variation (EV) for each factor and total unexplained variation (UEV) for different model runs, (c) the mass concentration of each factor. Note that a means the a-value which ranging from 0 to 0.5. The 4-factor solution of PMF result was also shown here.**

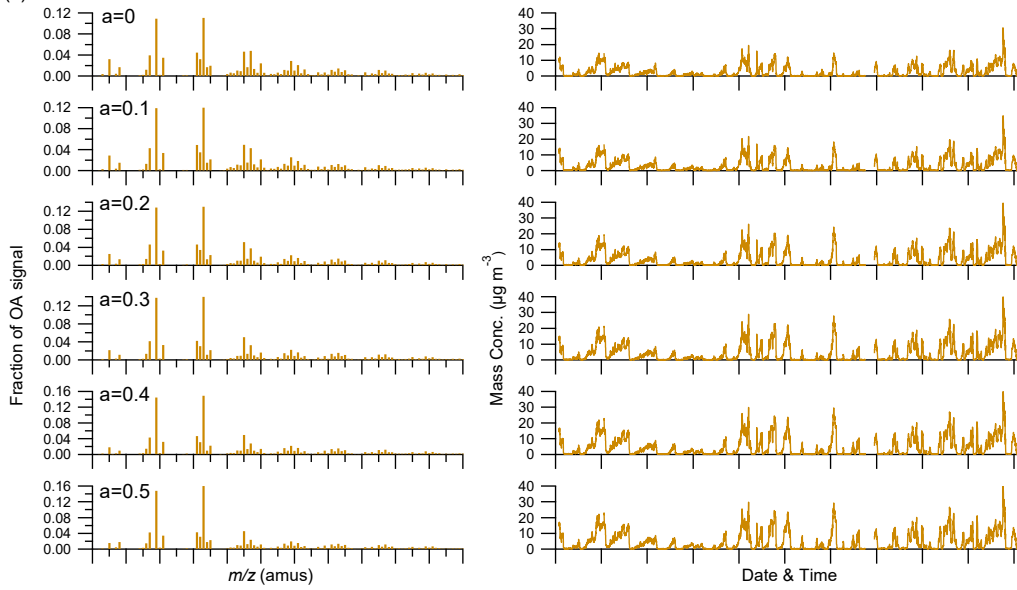
(a) FFOA



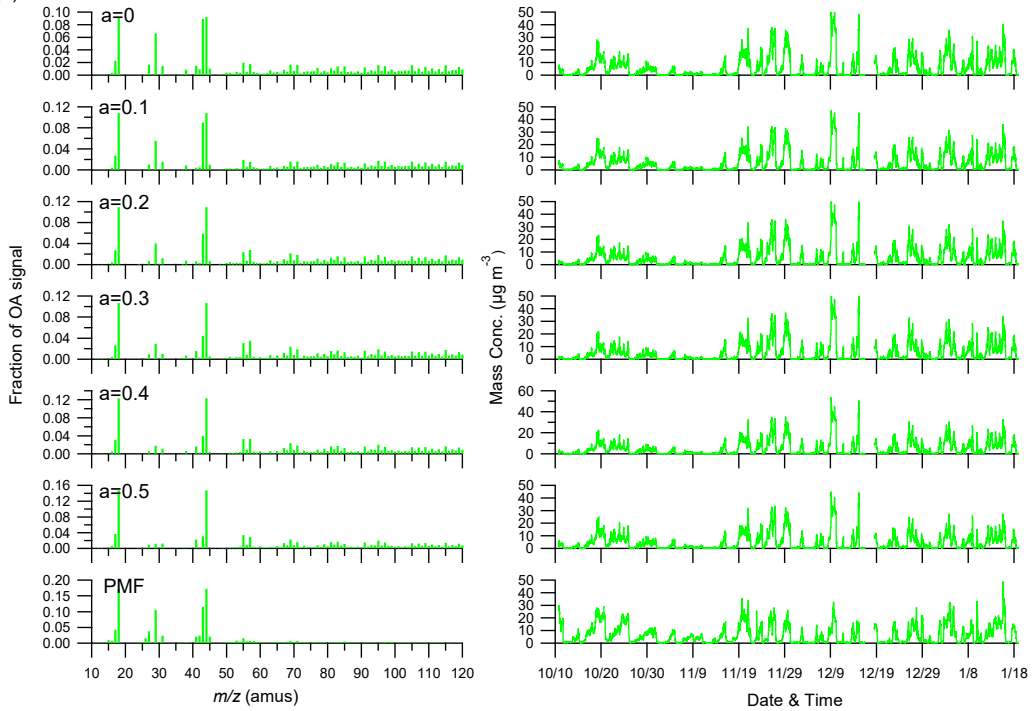
(b) COA



(c) BBOA



(d) LO-OOA



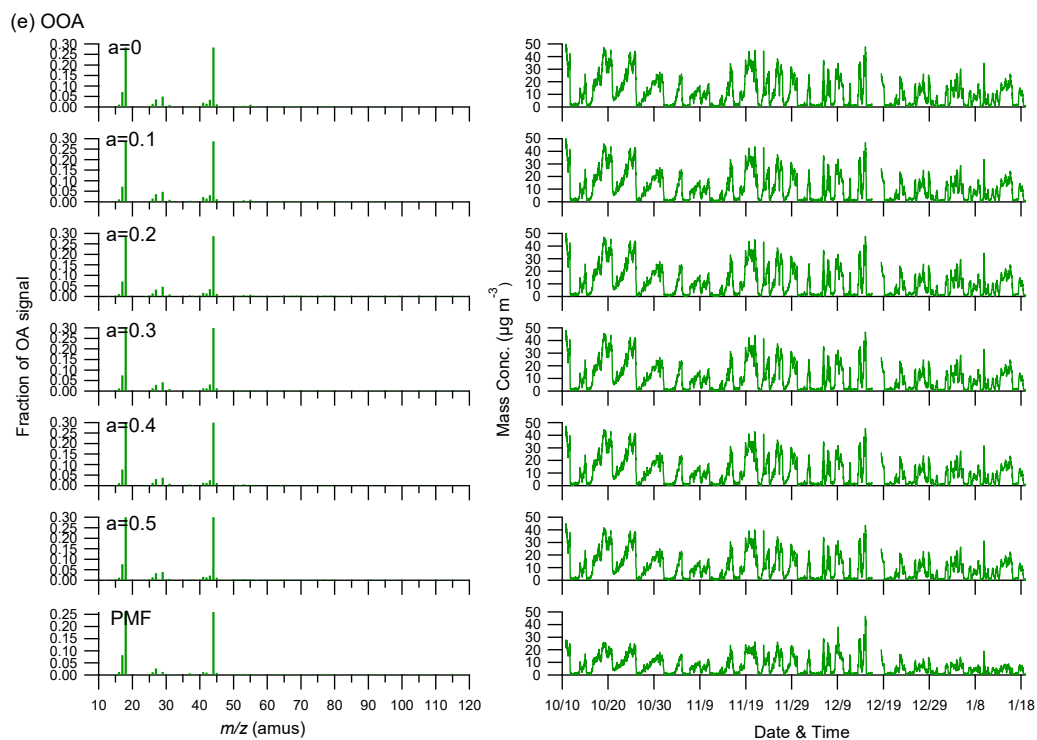
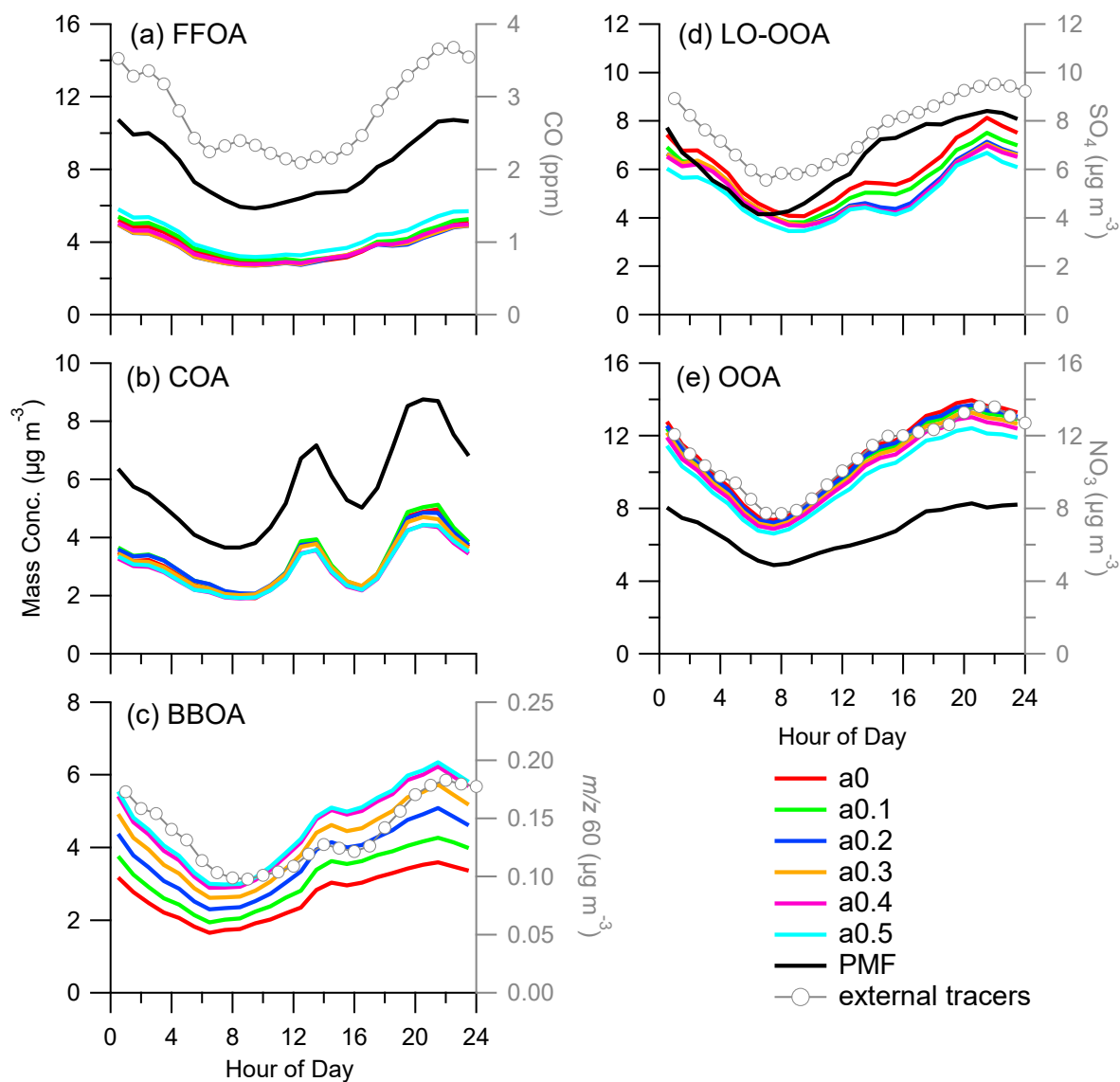
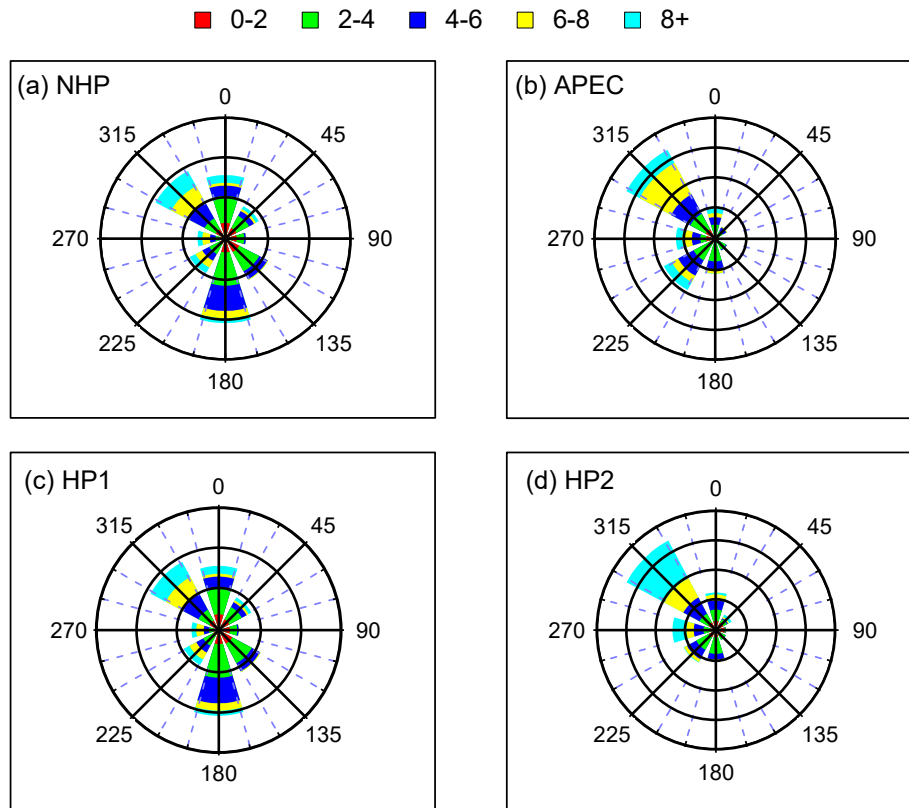


Figure S3: Mass spectra (left panel) and time series (right panel) of five organic aerosol (OA) components resolved at 260 m by ACSM using multi-linear engine 2 (ME-2): (a) fossil fuel-related OA (FFOA), (b) cooking OA (COA), (c) biomass-burning OA (BBOA), (d) low-oxidized oxygenated OA (LO-OOA), and (e) oxygenated OA (OOA). The 4-factor solution of PMF result was also shown here.

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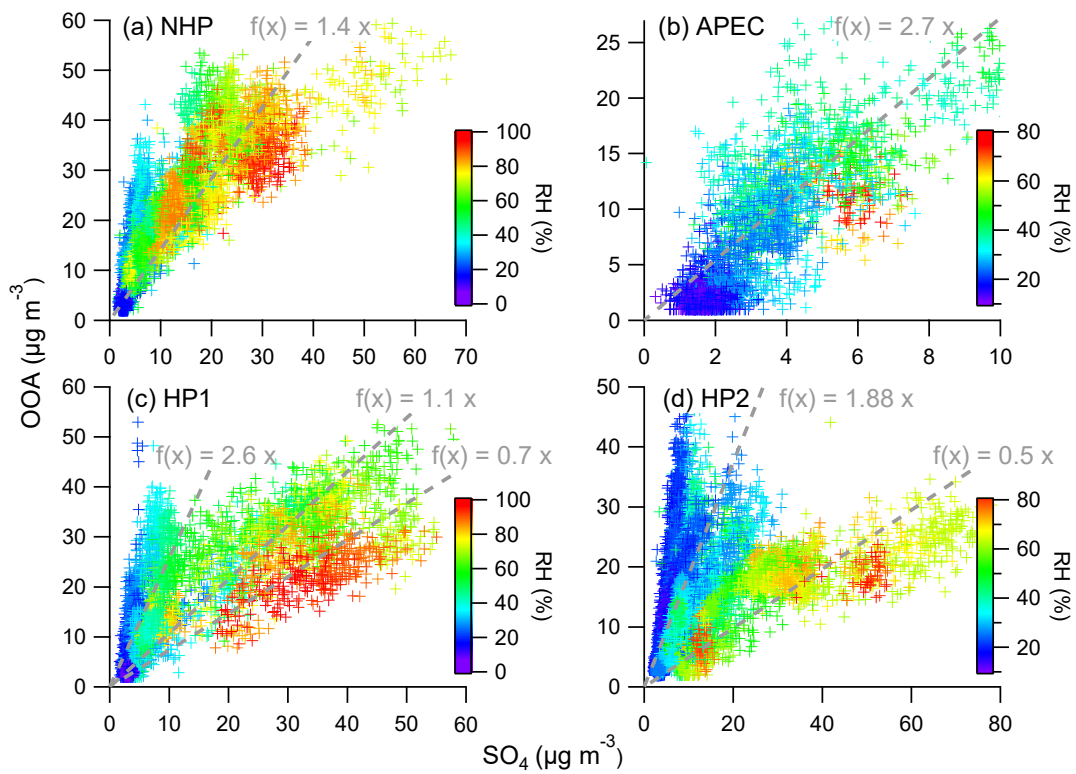


**Figure S4: Diurnal variations of (a) fossil fuel-related organic aerosol (FFOA), (b) cooking organic aerosol (COA), (c) biomass-burning OA (BBOA), (d) low-oxidized oxygenated organic aerosol (LO-OOA), and (e) oxygenated organic aerosol (OOA) for different model runs, with the variations of their external tracers on the right axis.**



**Figure S5: Wind rose plots during the four different periods (a-d), i.e., NHP, APEC, HP1, and HP2.**





**Figure S6:** The correlation between oxygenated organic aerosol (OOA) and sulfate during the four different periods (a-d), i.e., NHP, APEC, HP1, and HP2. The points were color-coded by RH. The regression equations between the two species are also shown.