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

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Table S1. The average concentrations of OA factors obtained with each a-value (Avg). Also shown are the correlation coefficients (R^2) and regression slopes (Slope) when a-value ranges from 0.1-0.5 versus the time series obtained for a-value = 0 for each OA factor.

	a-value=0	a-value=0.1	a-value=0.2	a-value=0.3	a-value=0.4	a-value=0.5
FFOA	Avg=3.8	Avg=4.0 R^2=0.99 Slope=1.04	Avg=3.6 R^2=0.97 Slope=0.95	Avg=3.7 R^2=0.96 Slope=0.95	Avg=3.7 R^2=0.97 Slope=0.99	Avg=4.3 R^2=0.96 Slope=1.15
COA	Avg=3.1	Avg=3.3 R^2=1.00 Slope=1.04	Avg=3.2 R^2=0.96 Slope=0.93	Avg=3.1 R^2=0.90 Slope=0.81	Avg=2.9 R^2=0.89 Slope=0.76	Avg=2.9 R^2=0.89 Slope=0.77
BBOA	Avg=2.7	Avg=3.2 R^2=0.99 Slope=1.17	Avg=3.7 R^2=0.97 Slope=1.36	Avg=4.1 R^2=0.94 Slope=1.48	Avg=4.5 R^2=0.93 Slope=1.56	Avg=4.6 R^2=0.91 Slope=1.54
LO-OOA	Avg=5.9	Avg=5.5 R^2=1.00 Slope=0.91	Avg=5.3 R^2=0.97 Slope=0.89	Avg=5.2 R^2=0.95 Slope=0.88	Avg=5.2 R^2=0.96 Slope=0.86	Avg=4.9 R^2=0.94 Slope=0.78
OOA	Avg=11.0	Avg=10.7 R^2=1.00 Slope=0.97	Avg=10.8 R^2=1.00 Slope=0.99	Avg=10.5 R^2=1.00 Slope=0.96	Avg=10.2 R^2=1.00 Slope=0.94	Avg=9.8 R^2=1.00 Slope=0.89

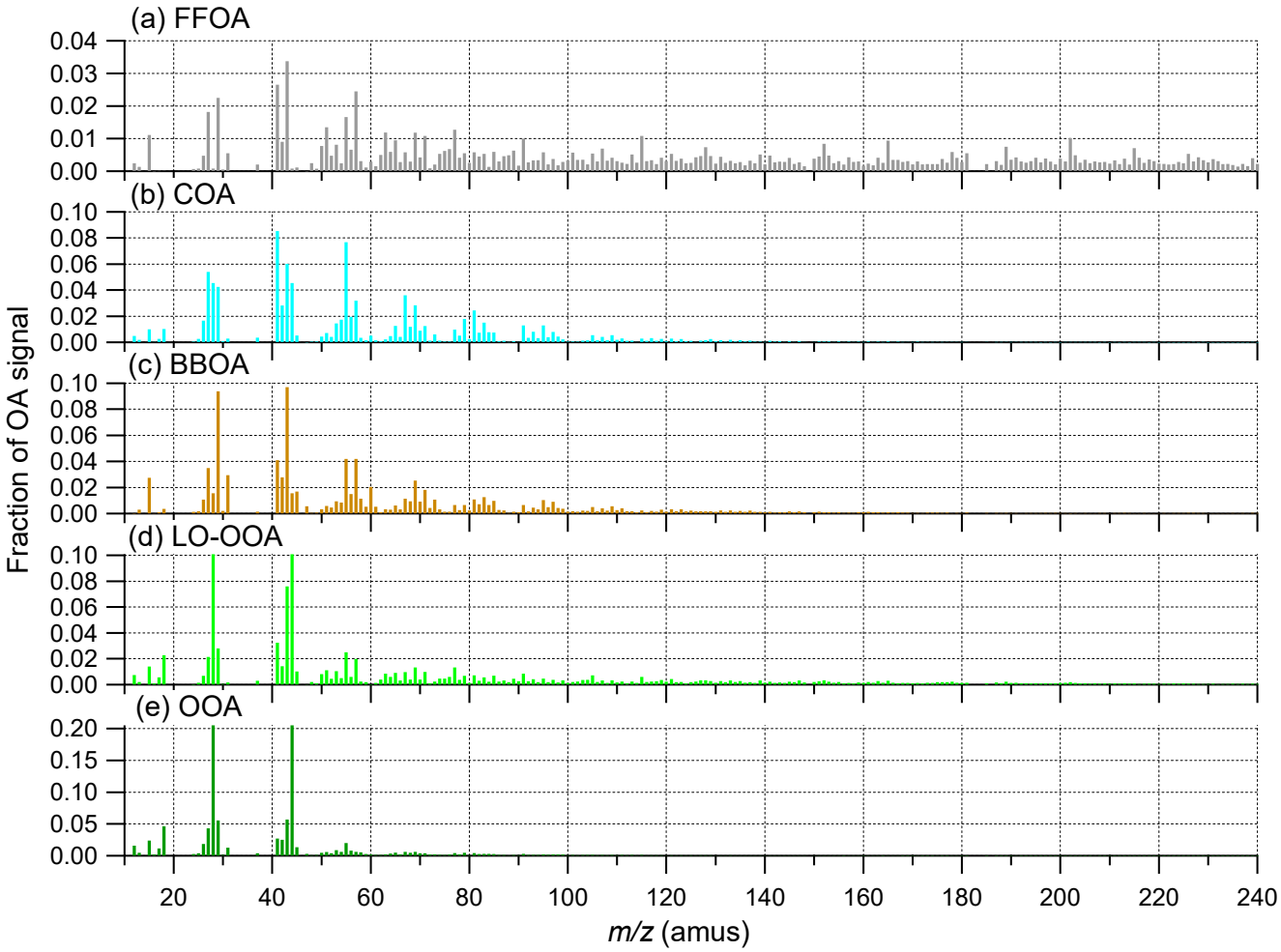
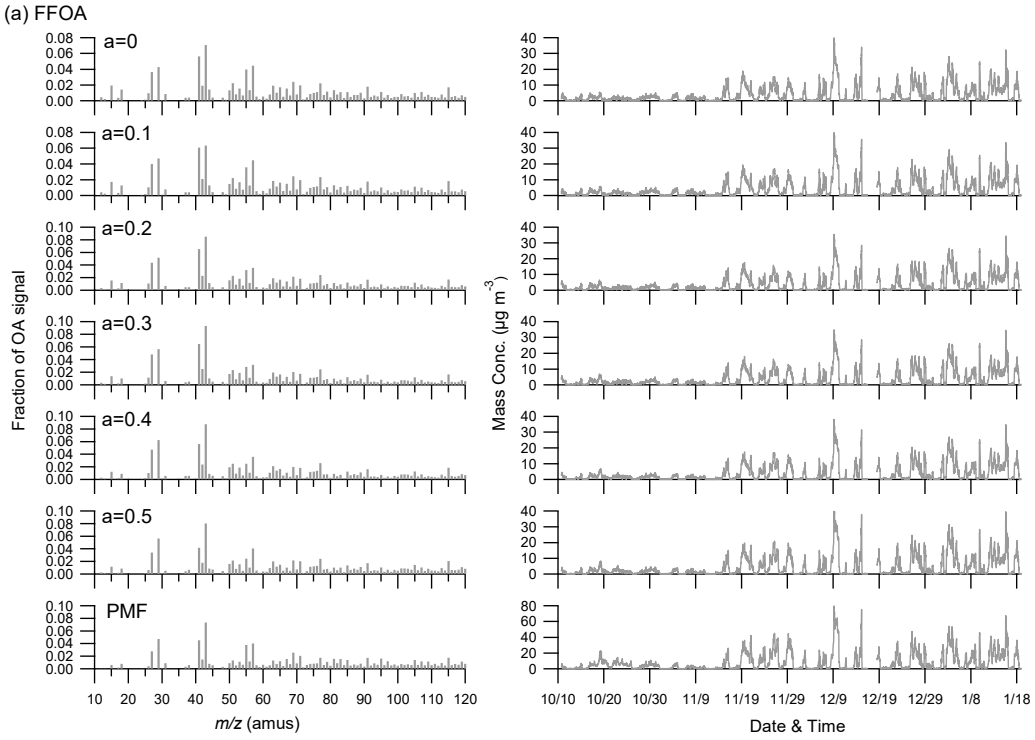
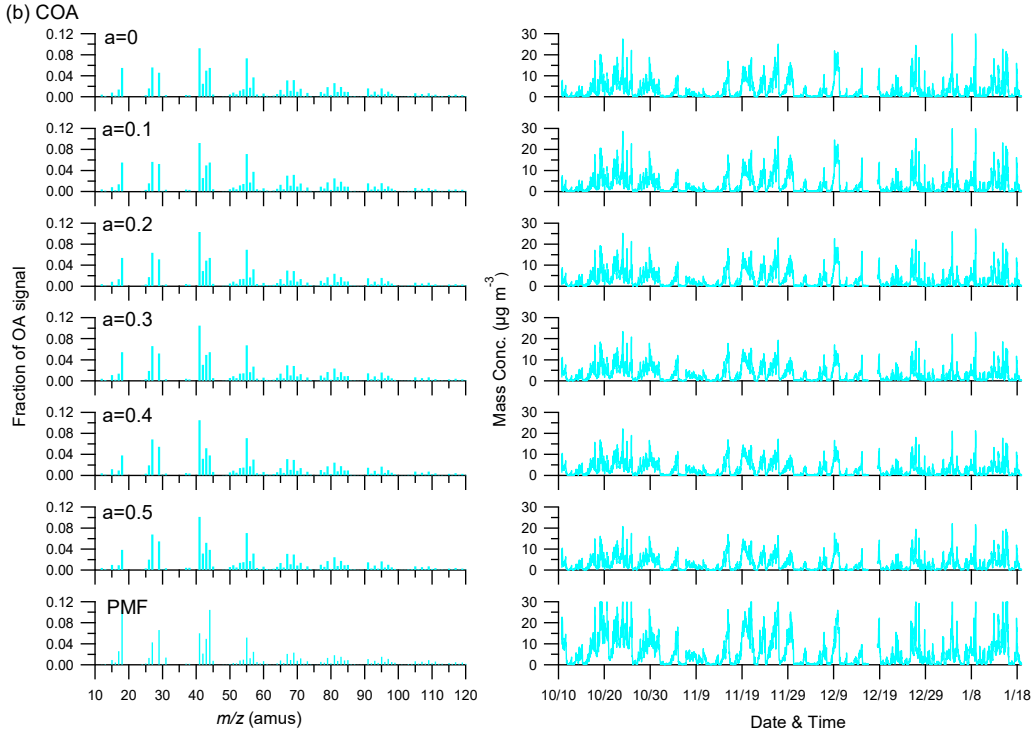
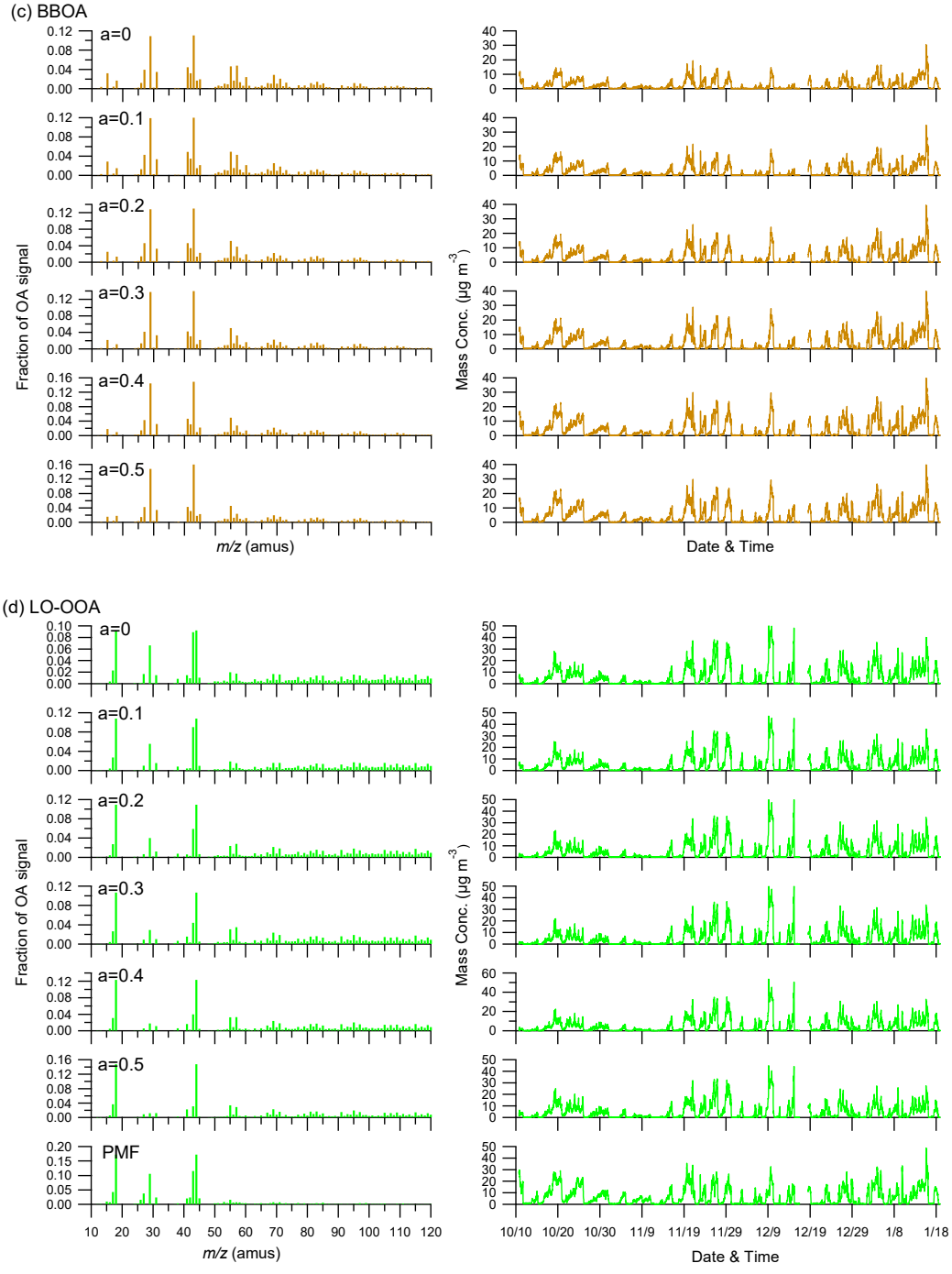


Figure S1: Mass spectra of five organic aerosol (OA) components resolved at ground level by HR-AMS using positive matrix factorization (PMF): (a) fossil fuel-related OA (FFOA), (b) cooking OA (COA), (c) biomass-burning OA (BBOA), (d) low-oxidized oxygenated OA (LO-OOA), and (e) oxygenated OA (OOA).


(a) FFOA
a=0
a=0.1
a=0.2
a=0.3
a=0.4
a=0.5
PMF
Fraction of OA signal
m/z (amus)
Mass Conc. (μg m-3)
Date & Time
10/10 10/20 10/30 11/9 11/19 11/29 12/9 12/19 12/29 1/8 1/18


(b) COA
a=0
a=0.1
a=0.2
a=0.3
a=0.4
a=0.5
PMF
Fraction of OA signal
m/z (amus)
Mass Conc. (μg m-3)
Date & Time
10/10 10/20 10/30 11/9 11/19 11/29 12/9 12/19 12/29 1/8 1/18


(c) BBOA
a=0
a=0.1
a=0.2
a=0.3
a=0.4
a=0.5
Fraction of OA signal
Mass Conc. (µg m-3)
m/z (amus)
Date & Time
(d) LO-OOA
a=0
a=0.1
a=0.2
a=0.3
a=0.4
a=0.5
PMF
Fraction of OA signal
Mass Conc. (µg m-3)
m/z (amus)
10/10 10/20 10/30 11/9 11/19 11/29 12/9 12/19 12/29 1/8 1/18
Date & Time

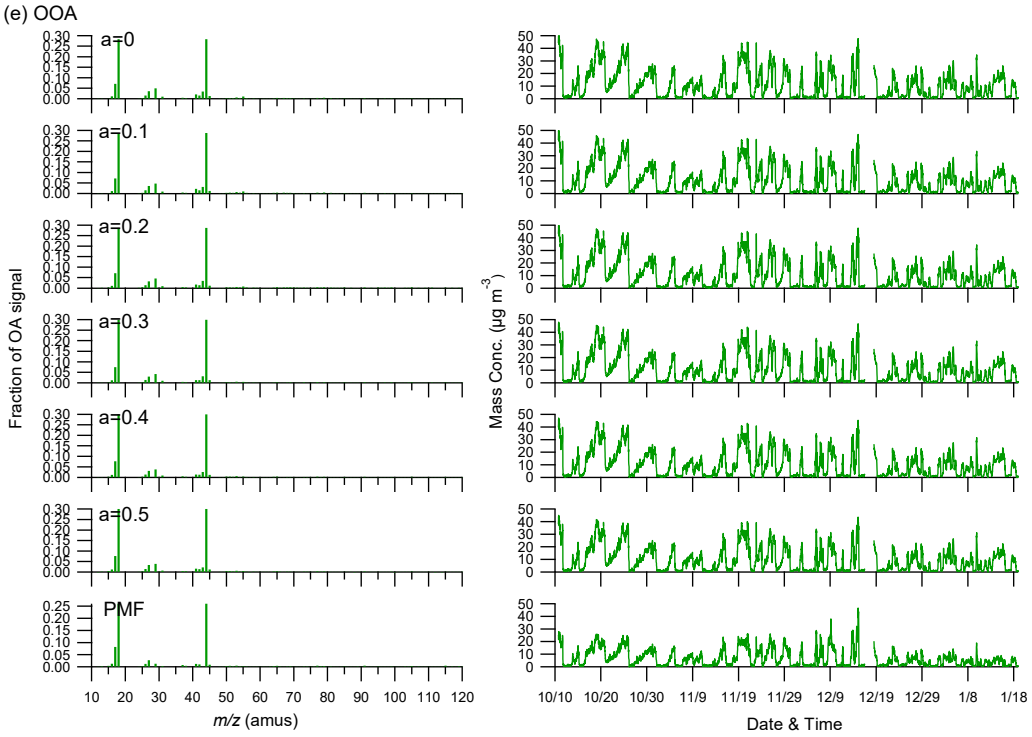


Figure S2: Mass spectra (left panel) and time series (right panel) of five organic aerosol (OA) factors resolved at 260 m by ACSM using multi-linear engine 2 (ME-2): (a) fossil fuel-related OA (FFOA), (b) cooking OA (COA), (c) biomass-burning OA (BBOA), (d) low-oxidized oxygenated OA (LO-OOA), and (e) oxygenated OA (OOA). The 4-factor solution of PMF result was also shown here. Note that the mass spectra of two SOA factors in (d) and (e) were unconstrained, and the a values refer to those of three POA factors (i.e., FFOA, COA and BBOA).

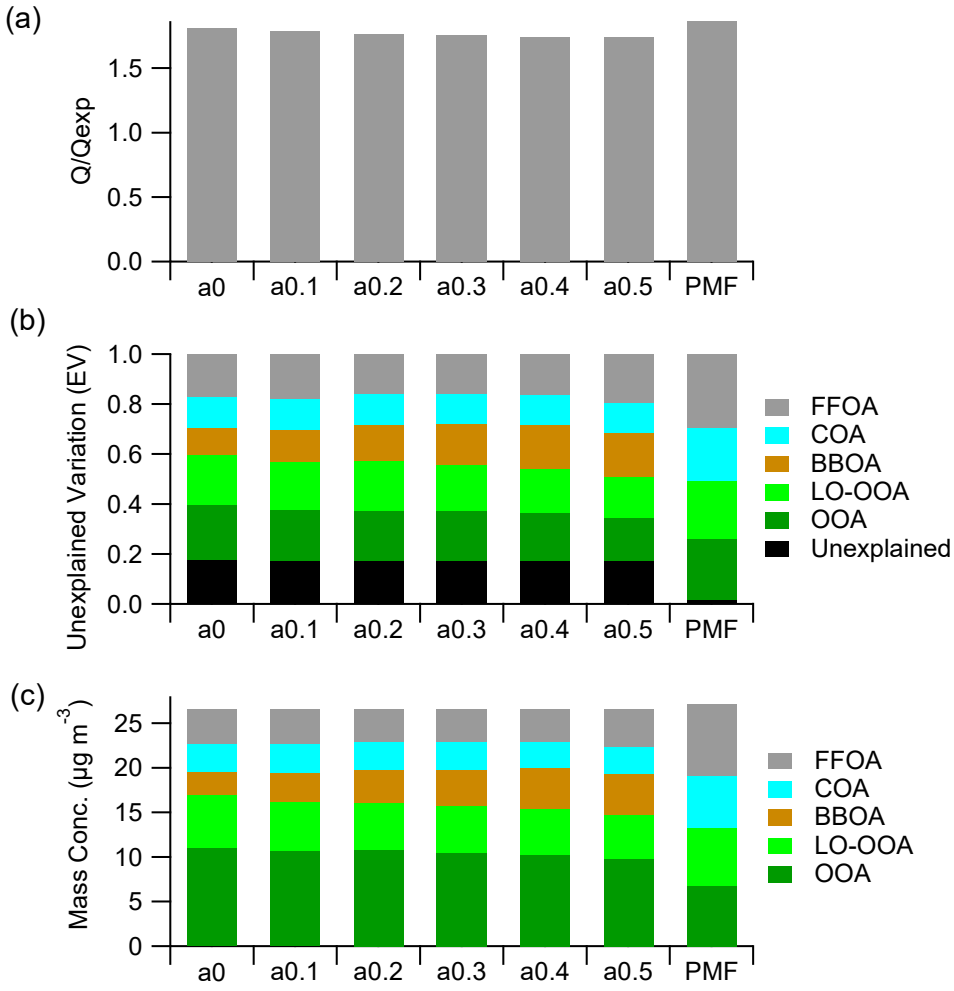


Figure S3: (a) Values of Q/Q_{exp}, (b) explained variation (EV) for each factor and total unexplained variation (UEV) for different model runs, (c) the mass concentration of each factor. Note that a means the a-value which ranging from 0 to 0.5. The 4-factor solution of PMF result was also shown here.

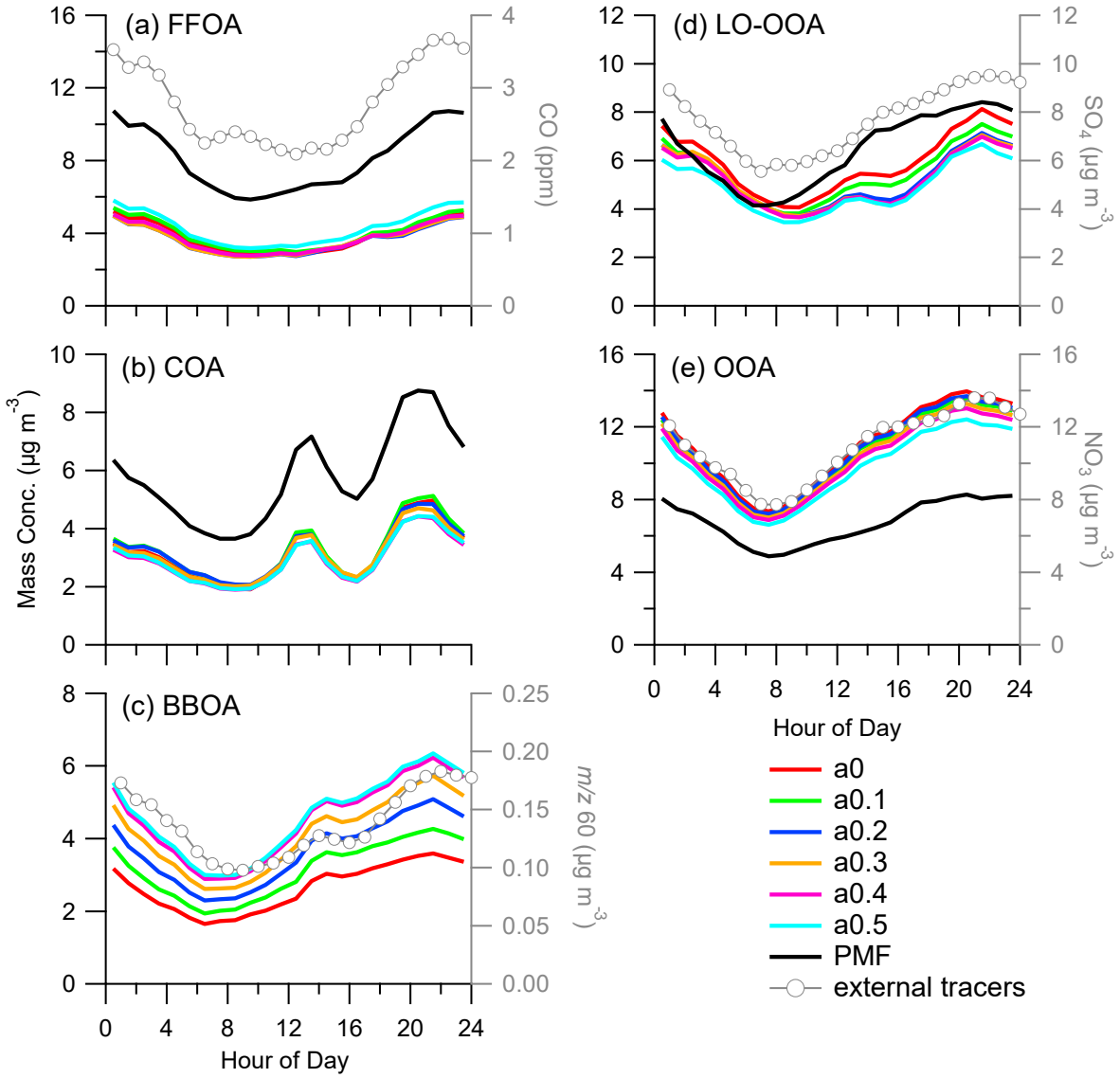


Figure S4: Diurnal variations of (a) fossil fuel-related organic aerosol (FFOA), (b) cooking organic aerosol (COA), (c) biomass-burning OA (BBOA), (d) low-oxidized oxygenated organic aerosol (LO-OOA), and (e) oxygenated organic aerosol (OOA) for different model runs, with the variations of their external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

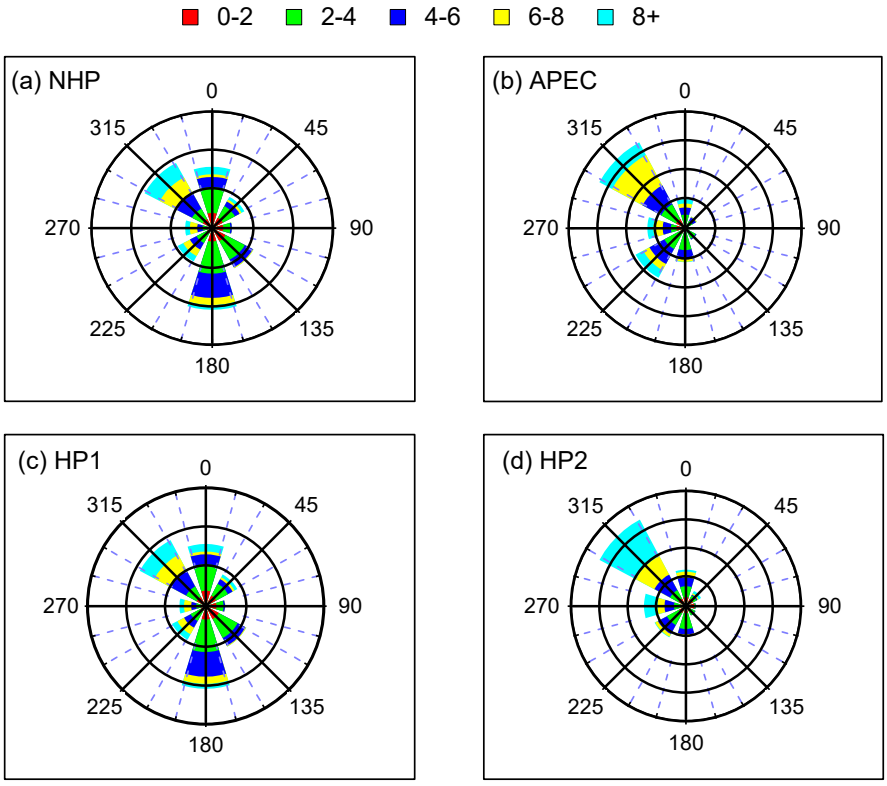


Figure S5: Wind rose plots during the four different periods (a-d), i.e., NHP, APEC, HP1, and HP2.

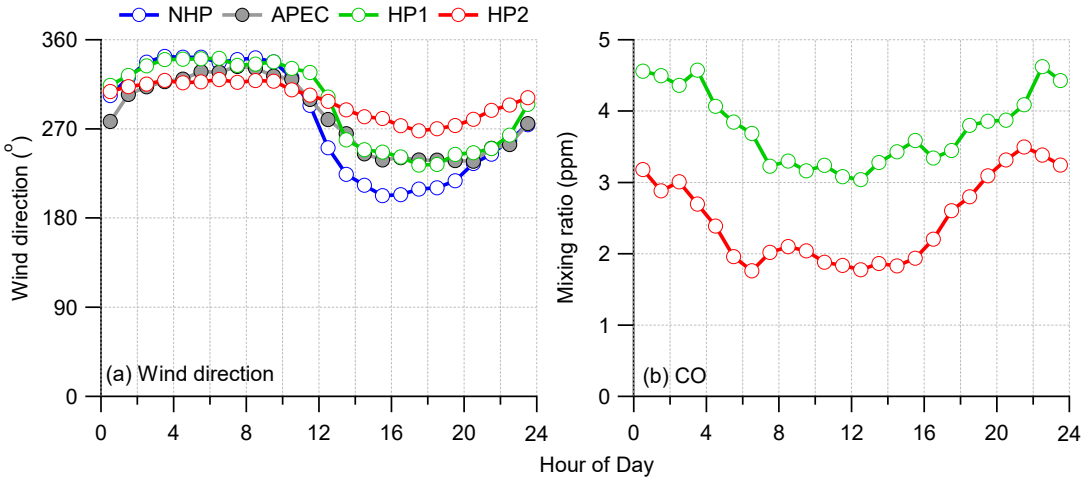


Figure S6: Diurnal variations of (a) wind direction and (b) CO during the four different periods, i.e., NHP, APEC, HP1, HP2. Note that the CO data were not available during NHP and APEC.

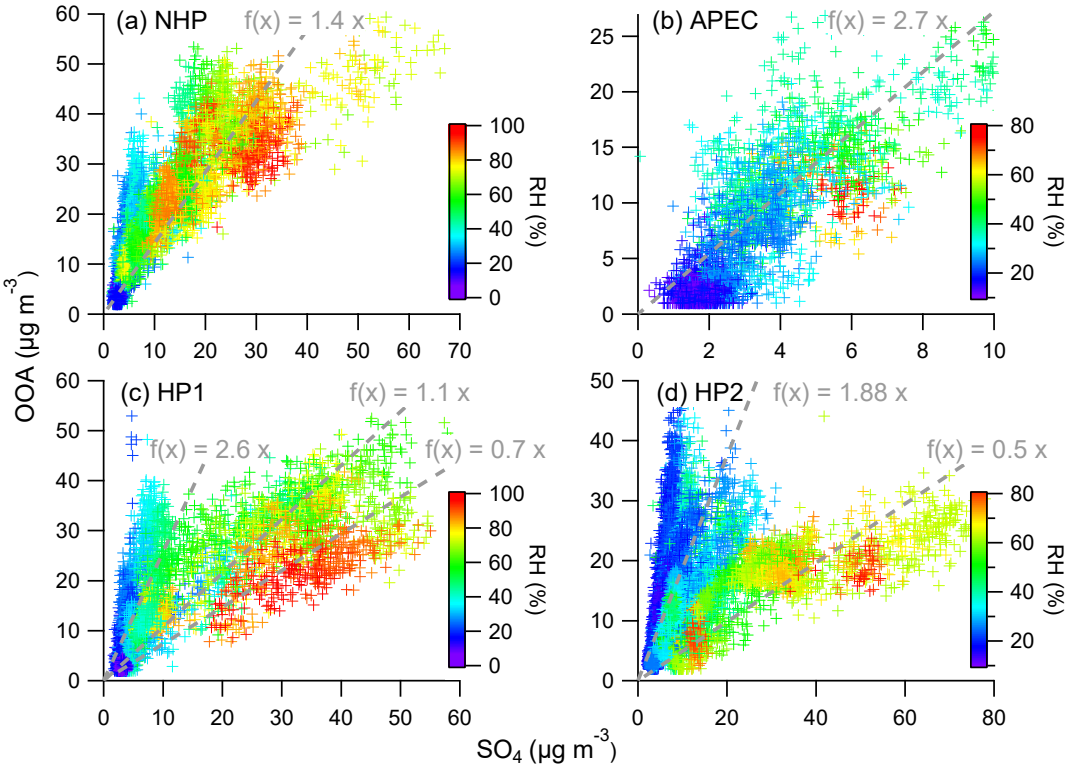


Figure S7: The correlation between oxygenated organic aerosol (OOA) and sulfate during the four different periods (a-d), i.e., NHP, APEC, HP1, and HP2. The points were color-coded by RH. The regression equations between the two species are also shown.