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Characterization of submicron organic particles in Beijing during summertime: comparison between SP-AMS and HR-AMS

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Table S1. Comparisons of gaseous species, BC-PM_1 and NR-PM_1 species in different periods.

species/parameters		Case I	Case II	entire campaign
NO_2 (ppb)		26.7 ± 13.5	14.9 ± 5.9	19.1 ± 13.1
O_3 (ppb)		41.7 ± 30.0	84.6 ± 30.6	59.4 ± 34.7
T (℃)		26.1 ± 4.1	29.8 ± 3.8	26.7 ± 4.9
BC-PM_1 Org vs NO_2/O_3 (r^2)		0.42/0.15	0.12/0.02	0.23/0.0003
NR-PM_1 Org vs NO_2/O_3 (r^2)		0.15/0.001	0.05/0.05	0.06/0.08
BC-PM_1 vs NR-PM_1 (r^2)	Org	0.27	0.66	0.49
	SO_4^{2-}	0.74	0.73	0.70
	NO_3^-	0.90	0.81	0.86
	HOA	0.73	0.84	0.68
	LO-OOA	0.51	0.31	0.60
	MO-OOA	0.71	0.81	0.61
BC-PM_1 to NR-PM_1 ratio	Org	0.74 ± 0.32	0.46 ± 0.13	0.52 ± 0.24
	SO_4^{2-}	0.24 ± 0.11	0.19 ± 0.06	0.18 ± 0.09
	NO_3^-	0.37 ± 0.12	0.31 ± 0.07	0.30 ± 0.11
	HOA	1.19 ± 0.52	1.46 ± 0.52	1.23 ±0.57
	LO-OOA	0.50 ± 0.27	0.40 ± 0.16	0.48 ± 0.39
	MO-OOA	2.12 ± 0.64	0.51 ± 0.15	1.06 ±0.96

Table S2. Correlations of BC-PM_1 OA factors with their traces.

r^2	HOA	A-BBOA	OOA1	OOA2	OOA3
BC	**0.70**	0.07	**0.43**	0.10	0.10
$C_4H_9^+$	**0.92**	0.13	0.35	0.02	0.02
$C_9H_7^+$	**0.63**	0.10	0.39	0.03	0.03
NO_2 (gas)	**0.57**	0.00	0.20	0.02	0.00
$C_2H_3O^+$	0.26	0.44	**0.72**	0.30	0.03
$C_3H_5O^+$	0.23	0.50	**0.67**	0.34	0.03
$C_6H_{10}O^+$	0.50	0.36	**0.60**	0.19	0.02
$C_2H_4O_2^+$	0.26	**0.71**	0.27	0.31	0.04
$C_3H_5O_2^+$	0.23	**0.72**	0.27	0.35	0.02
CH_4N^+	0.20	**0.61**	0.25	**0.46**	0.00
$K_3SO_4^+$	0.06	0.64	0.06	0.38	0.00
O_3 (gas)	0.27	0.17	0.00	**0.33**	0.01
O_x	0.08	0.26	0.04	**0.45**	0.01
SO_4^{2-}	0.01	0.15	0.06	**0.92**	0.11
NO_3^-	0.01	0.00	0.04	0.05	**0.97**

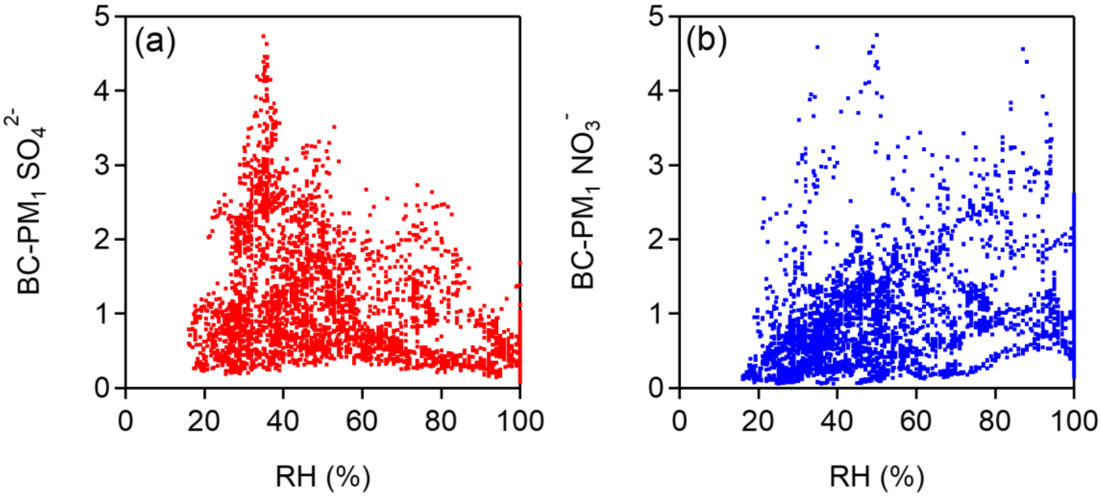

Figure S1. BC-PM_1 SO_4^{2-} (a) and NO_3^- (b) as a function of RH.

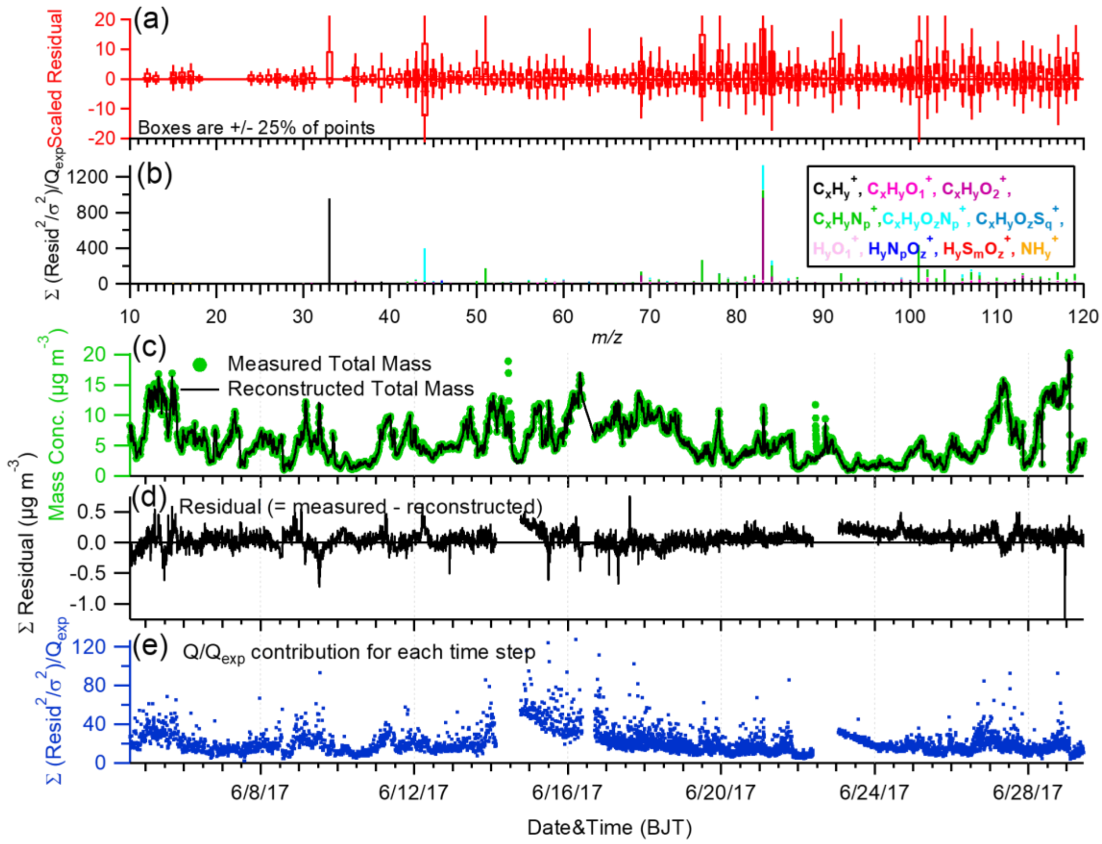

Figure S2. (a) the box and whiskers plot showing the distributions of scaled residuals for each m/z, (b) the Q/Qexp values for each ion, (c) time series of the measured and reconstructed total organics mass concentrations, (d) time series of the residual concentrations, and (e) the Q/Qexp values for each point in time.

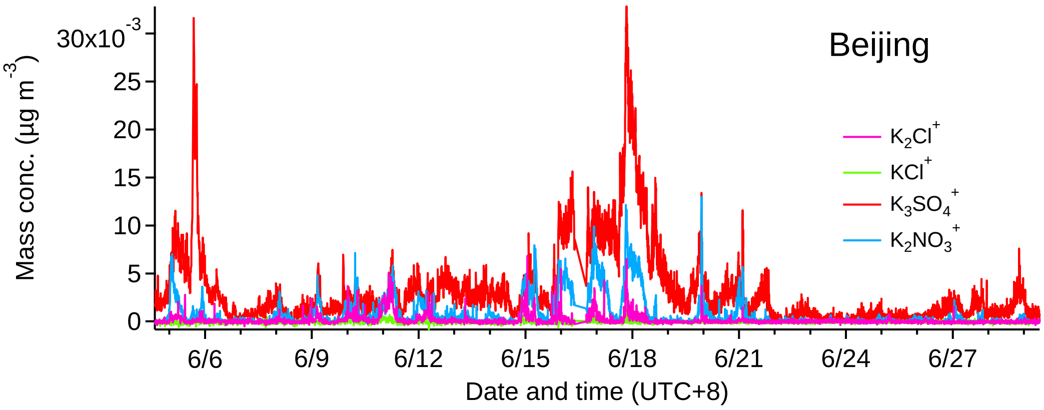

Figure S3. Time series of potassium-related ion fragments measured by SP-AMS.

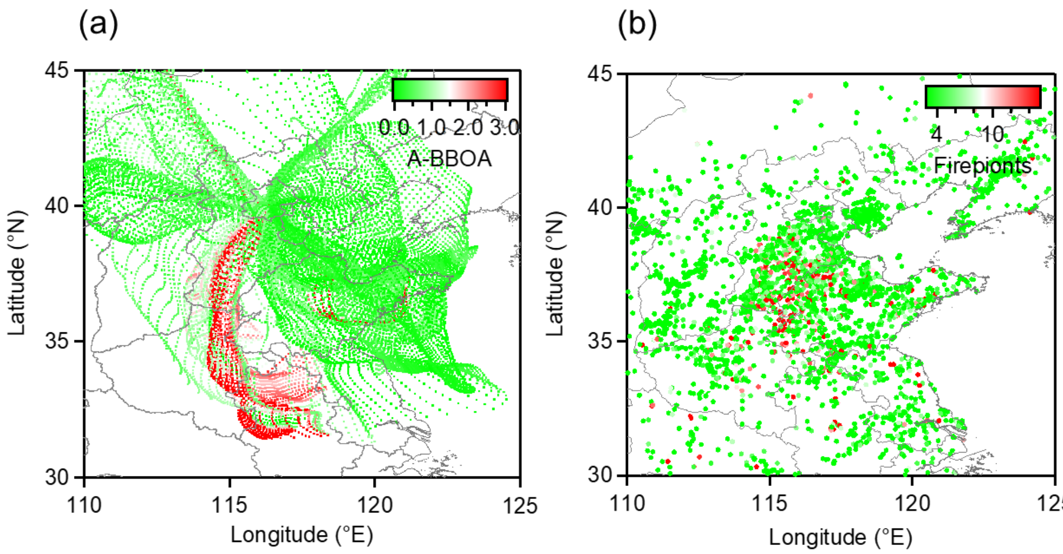

Figure S4. (a) 72-h back-trajectories from June 4 to 25, 2017 (Colored by A-BBOA mass concentration (μg m^{-3}), (b) fire-point plot (the color scale shows the numbers of fire points which was observed by NASA (https://earthdata.nasa.gov/firms.)).

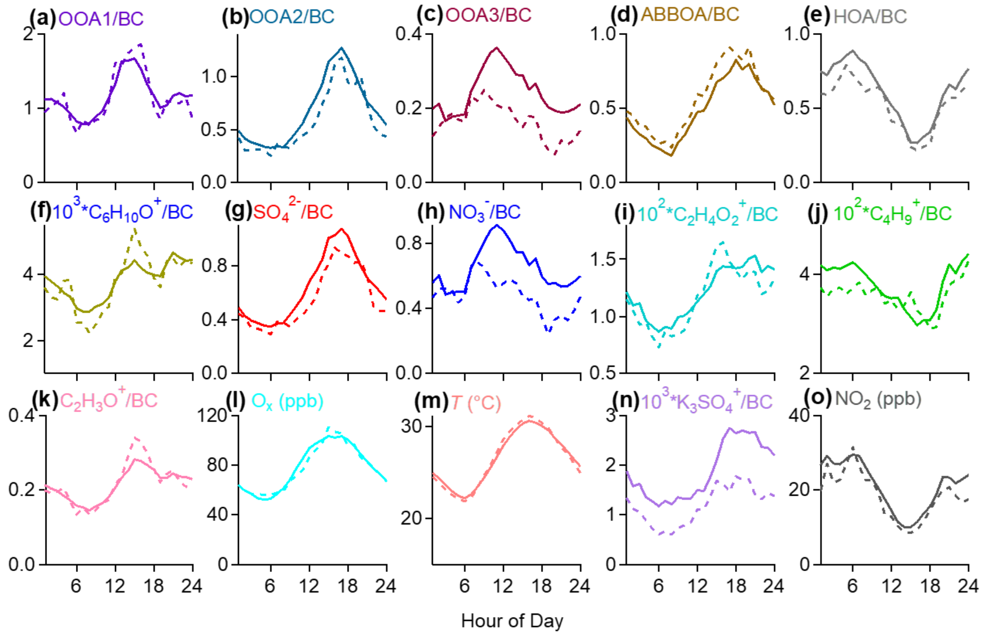

Figure S5. Diurnal cycles of mass ratios of BC-related species to BC core (five OA factors, tracer ion fragments, SO_4^{2-} and NO_3^-), T, and concentrations of gaseous species (O_x and NO_2). Mean values were in solid lines, mediate values were in dotted lines.

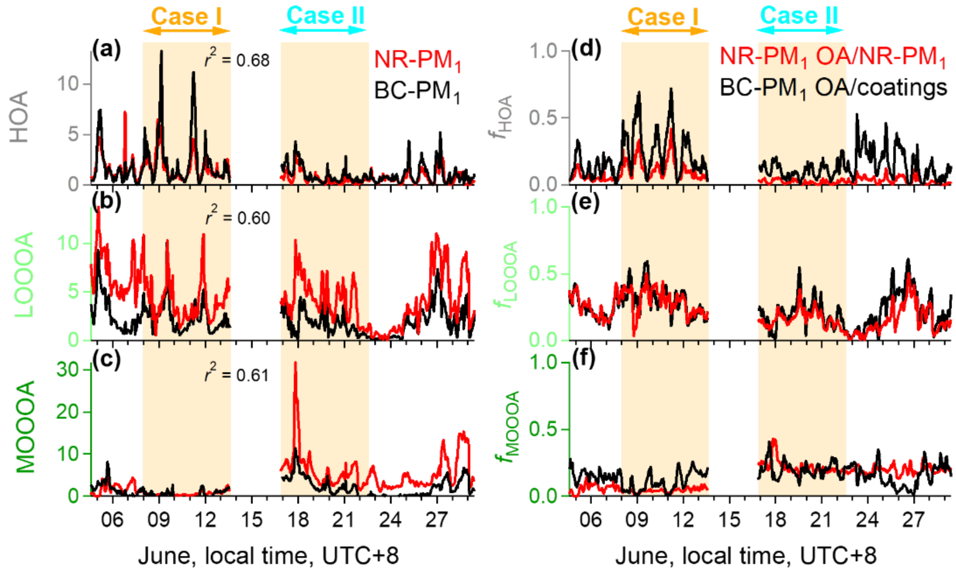

Figure S6. Temporal variations of NR-PM1 and BC-PM1 (a-c) HOA, LOOOA, and MOOOA (left panels) and (d-e) their fractions. NR-PM1 OA factors are in red, and the BC-PM1 OA factors are in black. Here BC-PM1 MOOOA is only the sum of OOA2 (sulfate-related OOA), and OOA3 (nitrate-related OOA).