Supplement of

Measurement report: Size-Resolved and Seasonal Variations in Aerosol Hygroscopicity Dominated by Organic Formation and Aging: Insights from a Year-Long Observation in Nanjing

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15

Table S1. The size-resolved κ_{mean} during different seasons.

Season	κ_{mean}				
	40 nm	80 nm	110 nm	150 nm	200 nm
Winter	0.12±0.04	0.18±0.05	0.20±0.05	0.22±0.04	0.24±0.05
Spring	0.14±0.04	0.19±0.05	0.20±0.04	0.22±0.04	0.25±0.05
Summer	0.12±0.04	0.15±0.05	0.17±0.05	0.18±0.05	0.21±0.05
Autumn	0.10±0.04	0.13±0.04	0.15±0.04	0.17±0.05	0.20±0.05
Annual	0.12±0.04	0.16±0.05	0.18±0.05	0.20±0.05	0.22±0.06

Table S2. The occurrence frequency of NPF events during different seasons.

Season	NPF occurrence frequency
annual	10.41 %
Winter	6.67 %
Spring	20.65 %
Summer	3.26 %
Autumn	10.99 %

20

Table S3. The change in percentage of size-resolved hygroscopicity parameters ($CV_{\kappa-PDF}$, κ_{mean}, NF_{NH}, κ_{NH}, NF_{LH}, κ_{LH}, NF_{MH}, κ_{MH}) during the NPF days compared with the non-NPF days.

D_p(nm)	(NPF $-$ non-NPF)/non-NPF × 100 %							
	$CV_{\kappa-PDF}$	κ_{mean}	NF_{NH}	κ_{NH}	NF_{LH}	κ_{LH}	NF_{MH}	κ_{MH}
40	6.86	-6.76	12.11	-4.50	-0.63	-2.40	-12.68	-0.37
80	0.39	-1.13	4.51	3.49	0.04	-1.12	-2.00	0.61
110	1.04	-3.31	5.24	4.36	11.59	-1.03	-7.20	-0.17
150	-4.83	2.43	-7.88	-0.85	-9.09	0.35	4.65	0.94
200	-11.17	5.07	-25.05	-12.16	-6.92	2.19	5.79	0.47

Table S4. The occurrence frequency of NPF events under the influence of different air masses during spring.

Cluster	NPF occurrence frequency
C1	11.16 %
C2	42.44 %
C3	25.00 %

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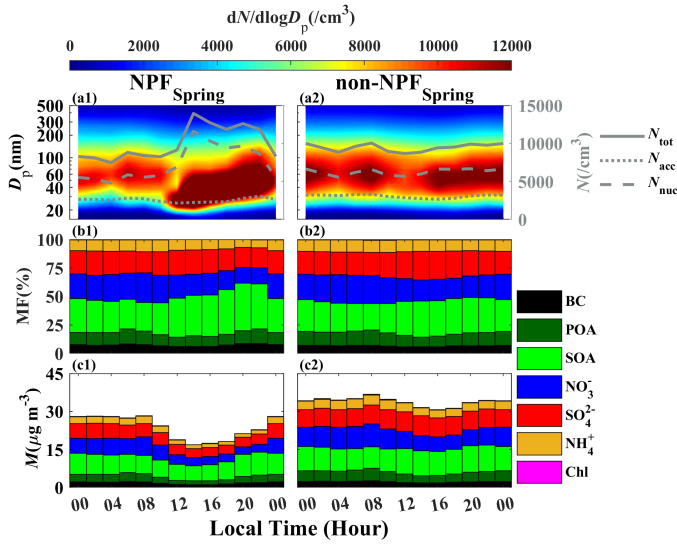
Figure S1. Diurnal variations of (a1, a2) particle number size distributions (PNSD), total particle number concentration (N_{tot}), accumulation-mode particle number concentration (N_{acc}), and nucleation-mode particle number concentration (N_{nuc}), (b1, b2) mass fractions (MF) of aerosol chemical species, and (c1, c2) mass concentrations (M) of aerosol chemical species in spring NPF days (NPF$_{spring}$) and spring non-NPF days (non-NPF$_{spring}$).

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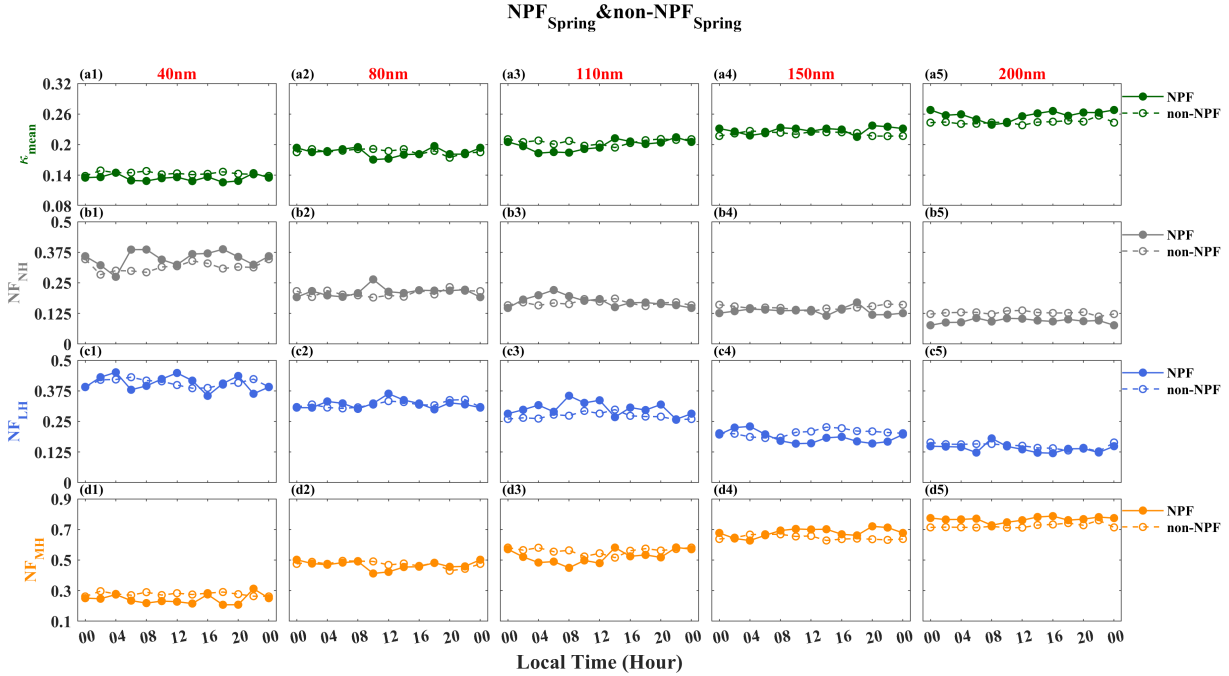
Figure S2. Diurnal variations of the (a1–a5) κ_{mean}, (b1–b5) NF$_{MH}$, (c1–c5) NF$_{LH}$, and (d1–d5) NF$_{NH}$ for different size particles (40–200 nm) in spring NPF days (solid lines with dots) and spring non-NPF days (dashed lines with dots).

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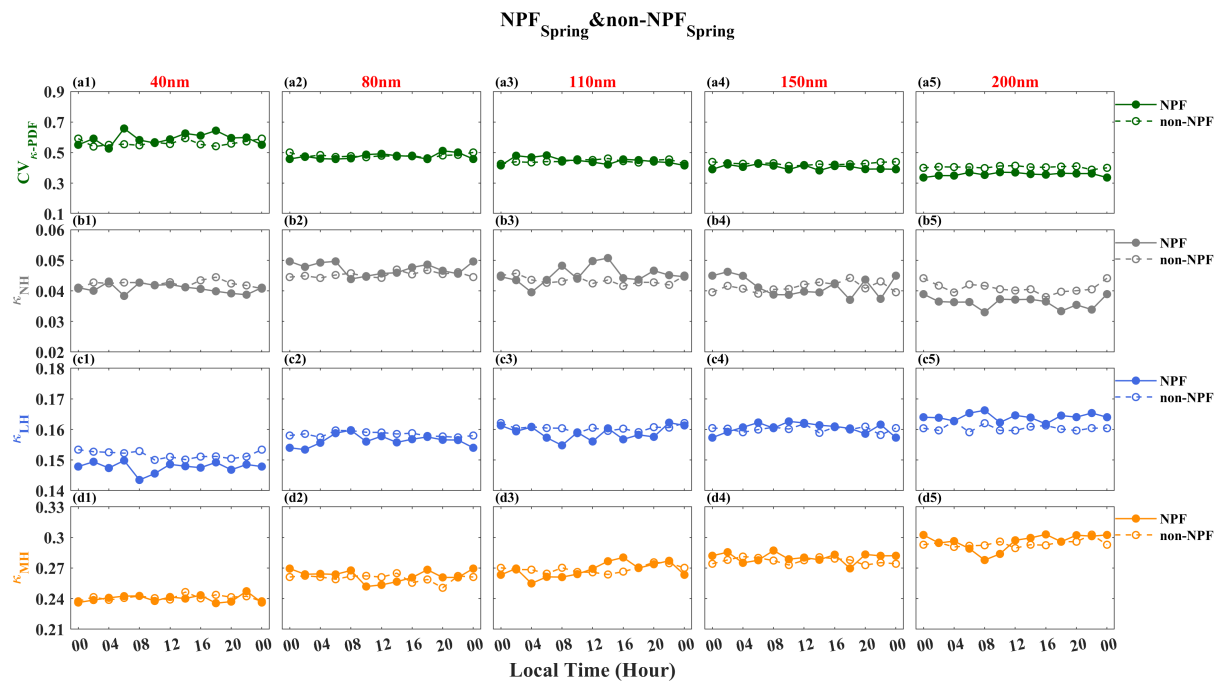
Figure S3. Diurnal variations of the (a1–a5) CV$_{\kappa\text{-PDF}}$, (b1–b5) κ_{MH}, (c1–c5) κ_{LH}, and (d1–d5) κ_{NH} for different size particles (40–200 nm) in spring NPF days (solid lines with dots) and spring non-NPF days (dashed lines with dots).
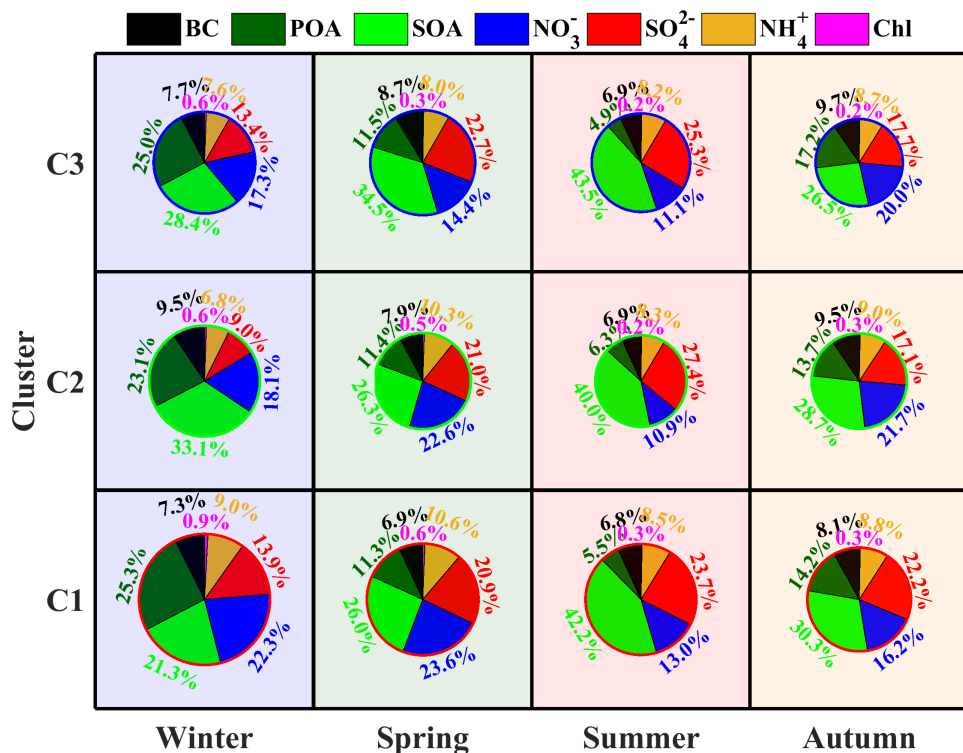
Figure S4. The mass fractions (MF) of aerosol chemical components under the influence of different air masses in different seasons. The size of the pie charts represents the PM$_{2.5}$ mass concentration. The border colors of the pie charts indicate the air mass types, i.e., red for Cluster C1, green for Cluster C2, and blue for Cluster C3. The background shading colors represent the seasons, i.e., blue for winter, green for spring, red for summer, orange for autumn.
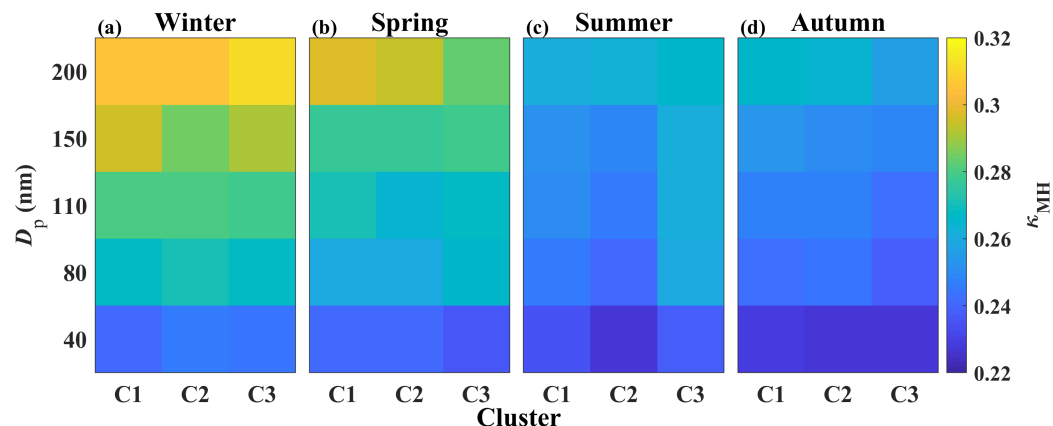
Figure S5. The κ_{MH} for all size particles (40–200 nm) in the influence of different air masses during different seasons.