

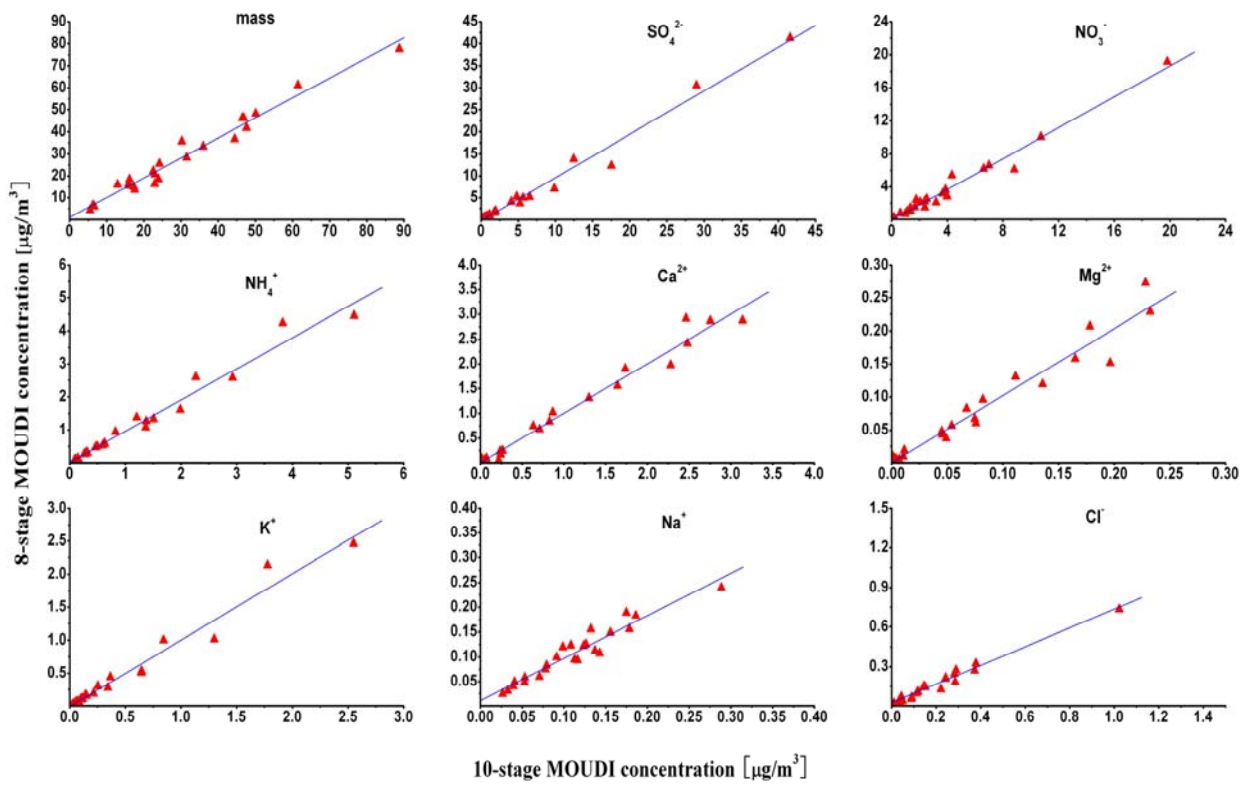
1 **Supplement**

2 **S1. Inter-comparison of two MOUDIs and charge balance**

3 Because two MOUDIs were sampling at two sites separately, it's necessary to
4 do the inter-comparison of two MOUDIs. Therefore, two MOUDIs were placed at
5 the same site to collect collocated 24h samples during June 7th to 9th simultaneously.
6 Figure S1 shows the inter-comparison results in the size range of 0.18~18 μm .
7 The results of linear regression of the two data sets are showed in Table S1, in
8 which y-axis represents the data of 8-stage MOUDI, x-axis represents the data of
9 10-stage MOUDI. It shows that the two data sets agree well. The slopes are around
10 one and the off-sets near zero.

11 Charge balances of analyzed ions were calculated to evaluate the results of
12 chemical analysis. The average values with standard deviations of these ratios are
13 listed in Table S2. The cation/anion ratios were almost unity in the fine particle
14 stages of 0.18-0.32 μm , 0.32-0.56 μm , 0.56-1 μm and 1-1.8 μm , indicating that
15 unanalyzed species play a minor role in fine particles. The cation/anion ratio was
16 much larger than unity in coarse particles, implicating the coarse particles
17 contained a large quantity of unanalyzed compounds which were not water-soluble,
18 such as silicate, carbonate and so on.

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21 **Figure S1 Correlation between 10-stage MOUDI and 8-stage MOUDI in the size**
 22 **range of 0.18 µm-18 µm. x-axis means the data of 10-stage MOUDI, and y-axis**
 23 **means those of 8-stage MOUDI. The lines are the result of linear regression.**

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26 **Table S1 Linear regression of two data sets of MOUDIs using $y=bx+c$, in which y**
 27 **represents the data of 8-stage MOUDI, x represents the data of 10-stage MOUDI,**
 28 **$n=24$ measurements.**

Mass or chemical compositions	mass	SO ₄ ²⁻	NO ₃ ⁻	NH ₄ ⁺	Ca ²⁺	Mg ²⁺	K ⁺	Na ⁺	Cl ⁻	F ⁻
b	0.908	0.988	0.938	0.944	0.999	1.014	1.007	0.859	0.708	0.991
c	0.921	-0.303	-0.090	0.018	0.004	0.001	-0.006	0.011	0.026	0
Correlation (R ²)	0.970	0.983	0.976	0.972	0.980	0.953	0.970	0.923	0.943	0.986

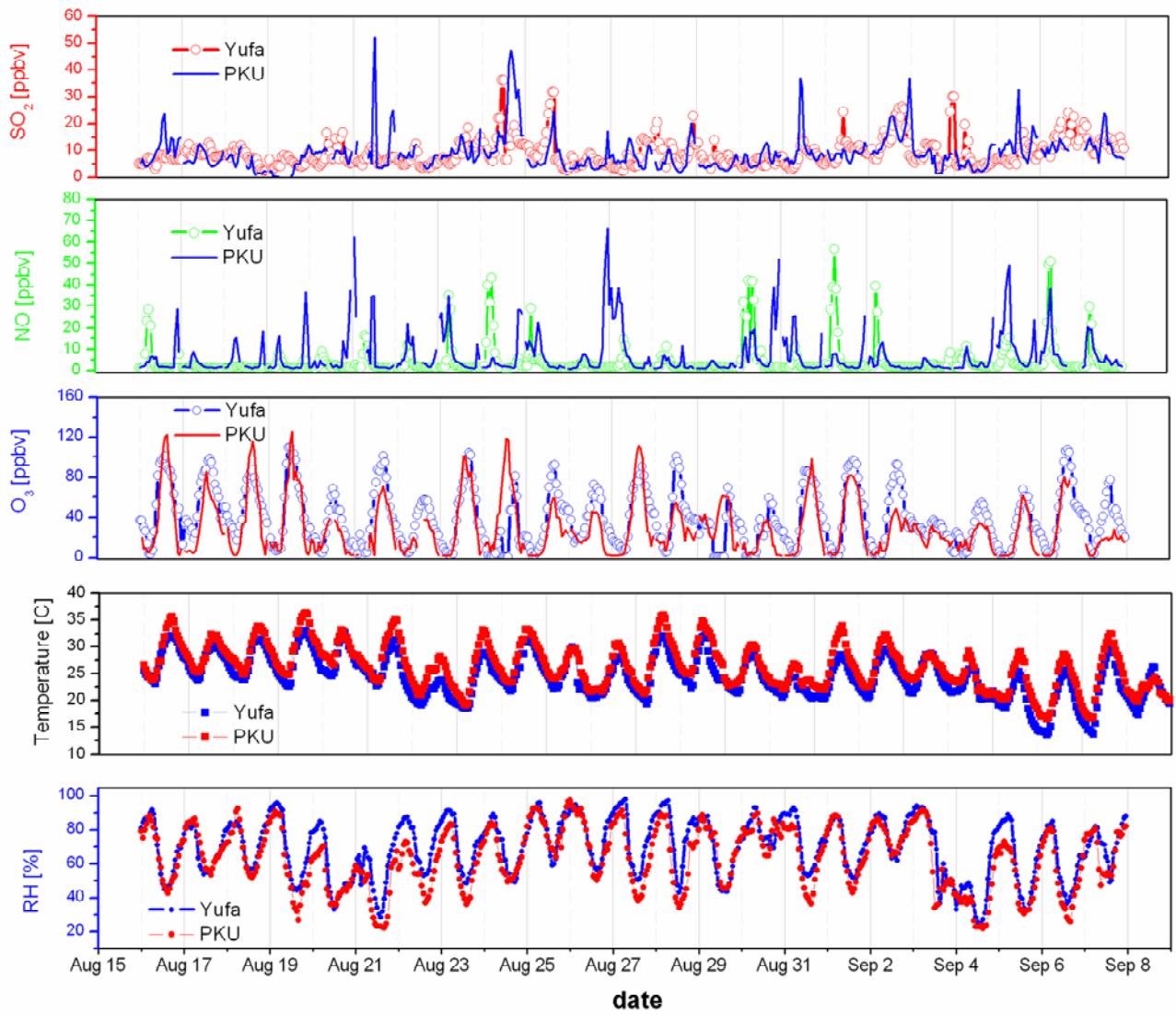
29 **Table S2 The charge balances for each stage of two MOUDIs, using the ratios of cation/anion with average values**
 30 **and standard deviations**

Dp(μm)	10-18	5.6-10	3.2-5.6	1.8-3.2	1-1.8	0.56-1	0.32-0.56	0.18-0.32	0.1-0.18	0.056-0.1
PKU	2.60±0.88	2.21±0.84	1.73±0.58	1.50±0.62	1.04±0.35	0.89±0.20	0.98±0.58	1.10±0.32	1.37±0.32	1.39±0.51
Yufa	2.12±1.12	1.84±0.73	1.49±0.62	1.34±0.45	1.01±0.38	0.92±0.21	0.96±0.32	1.18±0.56	-	-

31 **S2. General description of gaseous pollutants and meteorological conditions**

32 The information of the instrument for gaseous species is list in table S3. The
33 instrument was calibrated everyday during 0:00-1:00 for zero and span calibrations.
34 Multi-calibrations were carried on every two weeks.

35 The mixing ratios of SO₂, NO, O₃ and temperature, relative humidity during
36 the campaign are shown in Figure S2. SO₂ and NO are mainly from primary
37 emission of fossil fuel burning. The mixing ratios of SO₂ were not very high during
38 the whole campaign (9.0 ± 6.5 ppbv at PKU, 9.0 ± 5.2 ppbv at Yufa), and showed
39 similar variations at two sites. NO mixing ratios clearly depended on local traffic
40 with higher mixing ratios in the morning rush hours. The average NO mixing ratios
41 at two sites were 6.8 ± 9.5 ppbv at PKU and 4.3 ± 7.5 ppbv at Yufa, respectively. The
42 large standard deviations indicate the great variation of NO mixing ratio. O₃
43 indicated the photochemical process and showed distinct diurnal variation with the
44 highest hourly concentration in the afternoon. The meteorological conditions such
45 as temperature and RH were similar at two sites. Temperature was slightly higher
46 and humidity was a little lower at PKU. The wind speed during the campaign was
47 low, most of the time below 2 m/s, and the wind was from south and southwest.



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49 **Figure S2** Mixing ratios of SO₂, NO, O₃ and temperature, humidity during the
 50 **campaign**

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Table S3 Information of the instrument for gaseous species

Species	Instrument	Time resolution
SO ₂	Ecotech 9850B	1 min
CO	Ecotech 9830	1 min
O ₃	Ecotech 9810B	1 min
NO-NO _x	Ecotech 9841B	1 min

53 **S3. Table S4 Summary of wind speed, temperature and relative humidity in**
 54 **polluted and clean days. The values were hourly average from 7:00 to the next**
 55 **day 7:00.**

Date	Temperature (°C)			Relative humidity (%)			Wind speed (m/s)		
	Max	Min	Average	Max	Min	Average	Max	Min	Average
8/18-8/19	33.8	24.9	29.1	92.0	52.0	73.0	2.2	0.2	1.0
8/19-8/20	36.2	24.8	30.8	89.3	42.8	61.2	2.6	0.2	1.0
8/24-8/25	33.3	23.4	28.5	92.7	49.6	67.3	1.6	0.1	0.8
8/25-8/26	29.7	24.2	26.9	97.0	64.0	82.8	2.6	0.5	1.2
9/2-9/3	28.6	23.4	25.8	90.7	64.7	78.2	1.5	0.3	1.0
9/3-9/4	29.2	21.7	25.4	91.2	42.0	62.4	2.8	0.8	1.4
9/6-9/7	32.4	16.5	25.3	81.1	25.7	53.5	3.3	0.1	1.4
8/20-8/21	33.2	23.9	28.4	70.2	36.0	48.7	7.3	1.0	3.8
8/21-8/22	35.1	21.1	28.0	72.9	21.9	44.2	5.3	0.8	2.2
9/4-9/5	29.0	17.0	22.3	72.8	21.9	43.2	4.0	1.2	2.4

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