



Supplement of

Summertime response of ozone and fine particulate matter to mixing layer meteorology over the North China Plain

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Table S1 List of observation stations and locations.

No.	Site	Abbreviation	Station	longitude (° E)	latitude (° N)
1	BeiJing	BeiJ	China National Environmental Monitoring Centre	116.41	40.04
2	Tianjin	TianJ	Zhongshan North Road Station	117.21	39.17
3	Shijiazhuang	SJZ	Northwest Shuiyuan Station	114.49	38.13
4	Langfang	LangF	Langfang Hebei University of Technology Station	116.70	39.55
5	Baoding	BaoD	Yangguang North Street Station	115.48	38.93
6	Tangshan	TangS	Xiaoshan Station	118.19	39.62
7	Handan	HanD	Guangming South Street Station	114.50	36.57
8	Hengshui	HengS	Hengshui Ecology and Environment Bureau Station	115.68	37.73
9	Xingtai	XingT	Quanbei Street Station	114.53	37.09
10	Cangzhou	CangZ	Cangzhou Technical College Station	116.82	38.28
11	Taiyuan	TaiY	Taiyuan Jinyuan Station	112.48	37.71
12	Yangquan	YangQ	Nanzhuang Road Station	113.59	37.85
13	Changzhi	ChangZ	Changzhi Ecology and Environment Bureau Station	113.11	36.20
14	Jincheng	JinC	Jincheng Ecology and Environment Bureau Station	112.86	35.49
15	Jinan	JiNan	Jinan Environmental Monitoring Station	117.06	36.66
16	Zibo	ZiB	Beijing Road station	117.91	36.84
17	Jining	JiNing	Jinyu Road Station	116.63	35.43
18	Dezhou	DeZ	Baima Lake Station	115.83	36.95
19	Liaocheng	LiaoC	Liaocheng monitoring center Station	115.98	36.50
20	Binzhou	BinZ	Binzhou Ecology and Environment Bureau Station	118.01	37.38
21	Heze	HeZ	Heze Quality Supervision	115.53	35.21

Bureau Station					
22	Zhengzhou	ZhengZ	Zhengzhou Forty-seven Middle School Station	113.74	34.77
23	Kaifeng	KaiF	Jinming West Street Station	114.30	34.80
24	Anyang	AnY	Anyang Ecology and Environment Bureau Station	114.40	36.09
25	Hebi	HeB	Hebi Ecology and Environment Bureau Station	114.29	35.72
26	Xinxiang	XinX	Xinxiang Ecology and Environment Bureau Station	113.92	35.30
27	Jiaozuo	JiaoZ	Fengshou Middle Road Station	113.28	35.21
28	Puyang	PuY	Jinti Road Station	115.04	35.76

Table S2 List of observation species and metrics.

Species	Unit	Temporal resolution	Metrics
Gaseous pollutants			
O ₃	μg m ⁻³	1 h	Maximum daily 8 h average
SO ₂	μg m ⁻³	1 h	Daily average
NO ₂	μg m ⁻³	1 h	Daily average
PM _{2.5} and its major components			
PM _{2.5}	μg m ⁻³	1 h	Daily average
SO ₄ ²⁻ /NO ₃ ⁻ /NH ₄ ⁺	μg m ⁻³	1 h	Daily average
OC	μg m ⁻³	1 h	Daily average
Meteorological variables			
Temperature (T)	° C	1 h	Daily average
Relative humidity (RH)	%	1 h	Daily average
Wind speed (WS)	m s ⁻¹	1 h	Daily average
Wind direction (WD)	m s ⁻¹	1 h	Daily average
24-h precipitation	mm	24 h	Daily accumulated

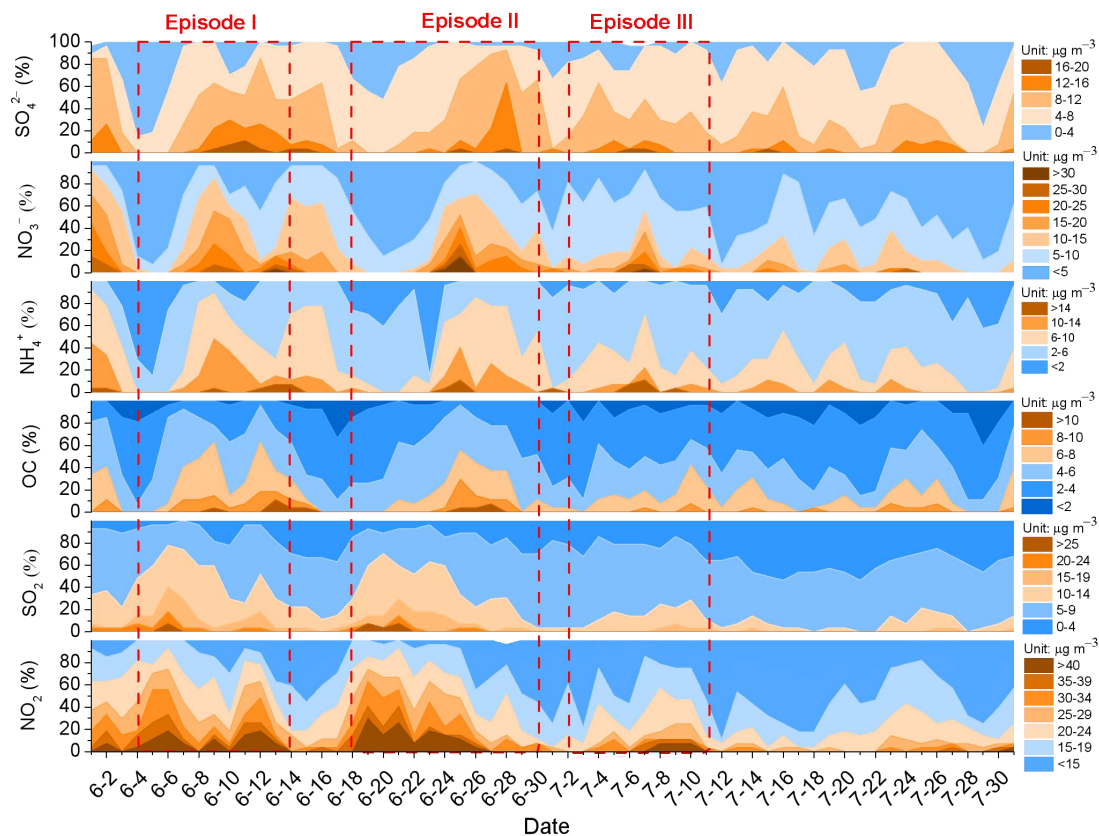


Figure S1. Occurrence frequency (%) of SO_4^{2-} , NO_3^- , NH_4^+ , OC, and gaseous pollutants (SO_2 and NO_2) under different levels in the NCP from June 1 to July 31, 2021. The colour shading represented different categories classified by SO_4^{2-} , NO_3^- , NH_4^+ , OC, and gaseous pollutants levels. Boxed areas delineated by red dashes represent three typical $\text{PM}_{2.5}$ and O_3 co-polluted episodes: June 4–14 (Episode I), June 18–29 (Episode II), and July 2–11 (Episode III), 2021.

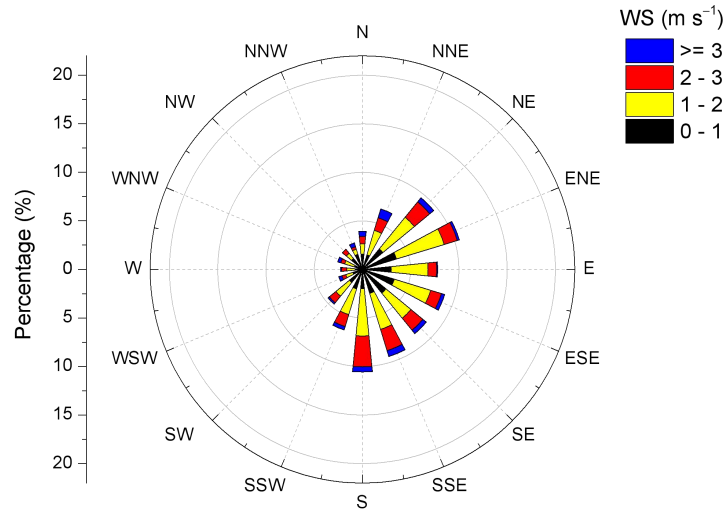


Figure S2. Overall WS and WD condition during the observation campaign.

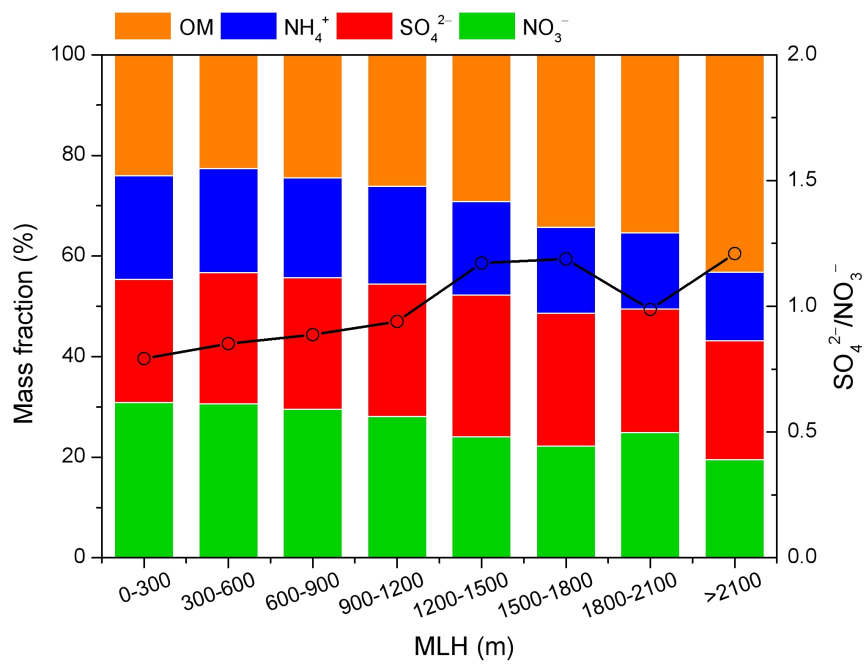


Figure S3. Mass fractions of major $PM_{2.5}$ components and the mass ratio of SO_4^{2-} to NO_3^- in different MLH conditions.

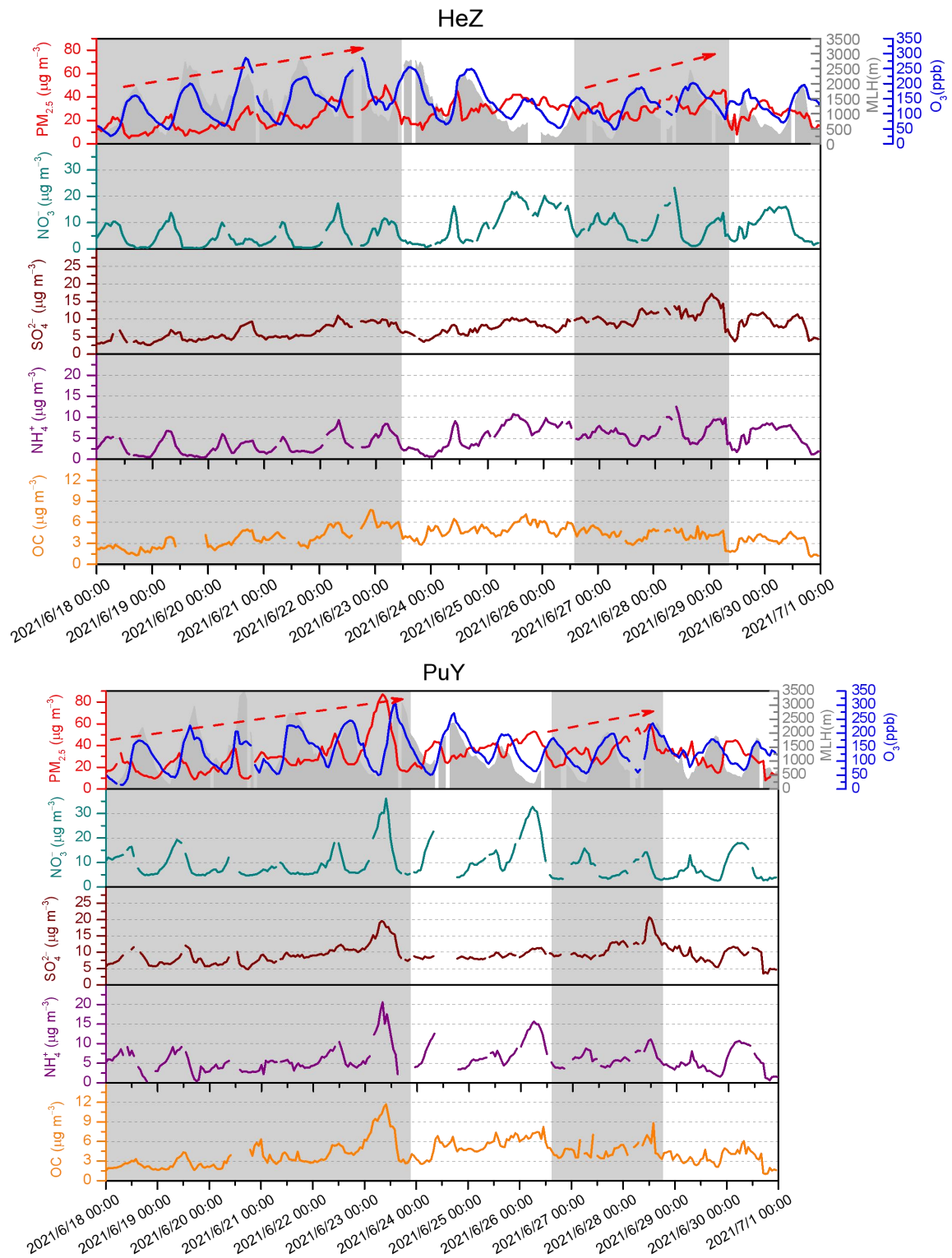


Figure S4. Hourly evolution of O₃, PM_{2.5}, its components and MLH in HeZ and PuY during June 18–29, 2021.

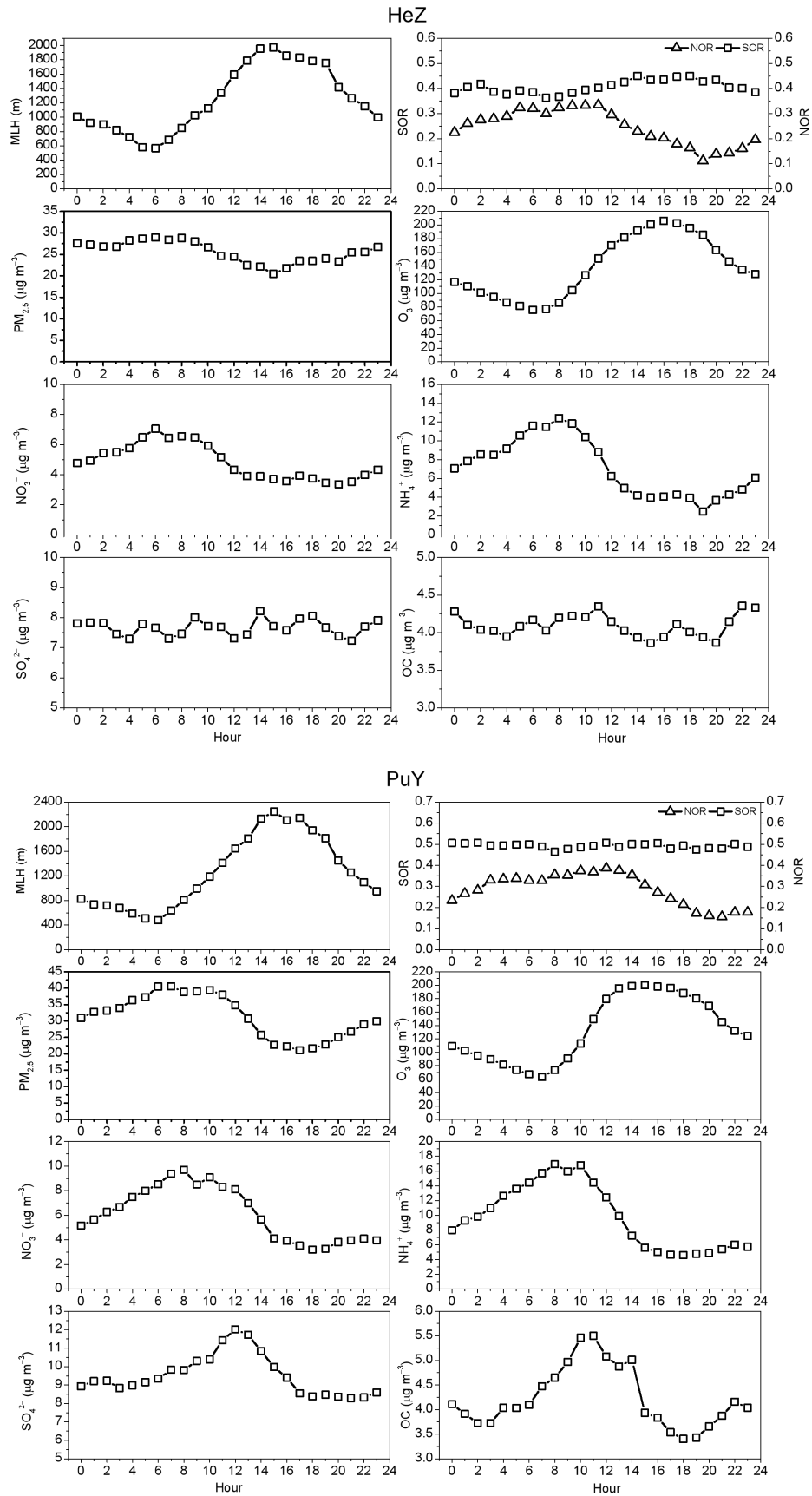


Figure S5. Diurnal variation of MLH, SOR, NOR, O_3 , $PM_{2.5}$, and its components in

HeZ and PuY during June 18-29, 2021.