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Supplement of

Mixing layer height on the North China Plain and meteorological evidence of serious air pollution in southern Hebei

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Table S1 Specific information of the observation sites on the NCP.

Cityname	Abbreviation	Province	Longitude	Latitude
		or municipality		
Beijing ^{a,b,c}	BJ	Beijing	116.32° E	39.90° N
Tianjin ^{a,b}	TJ	Tianjin	117.20° E	39.13° N
Shijiazhuang ^{a,b}	SJZ	Hebei	114.26° E	38.03° N
Langfang ^a	LF	Hebei	116.70° E	39.53° N
Tangshan ^a	TS	Hebei	118.02° E	39.68° N
Qinhuangdao ^{a,b}	QHD	Hebei	119.57° E	39.95° N
Zhangjiakou ^a	ZJK	Hebei	114.92° E	40.90° N
Chengde ^a	CD	Hebei	117.89° E	40.97° N
Laoting ^{b,c}	LT	Hebei	118.90° E	39.31° N
Cangzhou ^a	CZ	Hebei	116.83° E	38.33° N
Baoding ^a	BD	Hebei	115.48° E	38.85° N
Hengshui ^a	HS	Hebei	115.72° E	37.72° N
Xingtai ^{b,c}	XT	Hebei	114.48° E	37.05° N
Handan ^a	HD	Hebei	114.47° E	36.60° N
Dezhou ^a	DZ	Shandong	116.29° E	37.45° N
Liaocheng ^a	LC	Shandong	115.97° E	36.45° N
Jinan ^a	JN	Shandong	116.98° E	36.67° N
Binzhou ^a	BZ	Shandong	118.02° E	37.22° N
Dongying ^a	DY	Shandong	118.49° E	37.46° N
Zibo ^a	ZB	Shandong	118.05° E	36.78° N
Weifang ^a	WF	Shandong	119.06° E	36.68° N

^aNear-ground PM_{2.5} concentration sites.

^bCeilometer observation sites.

^cRadiosonde observation sites.

Table S2 Seasonal averages of the MLH at the BJ, SJZ, TJ and QHD stations in NCP from December 2013 to November 2014.

Station	Spring(m)	Summer(m)	Autumn(m)	Winter(m)
BJ	655±166	722±169	531±169	493±131
SJZ	489±142	623±161	404±147	347±153
TJ	627±189	655±165	493±169	436±178
QHD	498±217	447±153	451±146	467±180

Table S3 Annual means of T, RH, MLH and V_c for the BJ, SJZ, TJ and QHD stations in NCP from December 2013 to November 2014.

	T(°C)	RH (%)	MLH (m)	V _c (m ² s ⁻¹)
BJ	13.7	51.2	594	3054.5
SJZ	13.5	65.7	464	2045.4
TJ	14.1	57.0	546	
QHD	10.9	68.6	465	3021.0

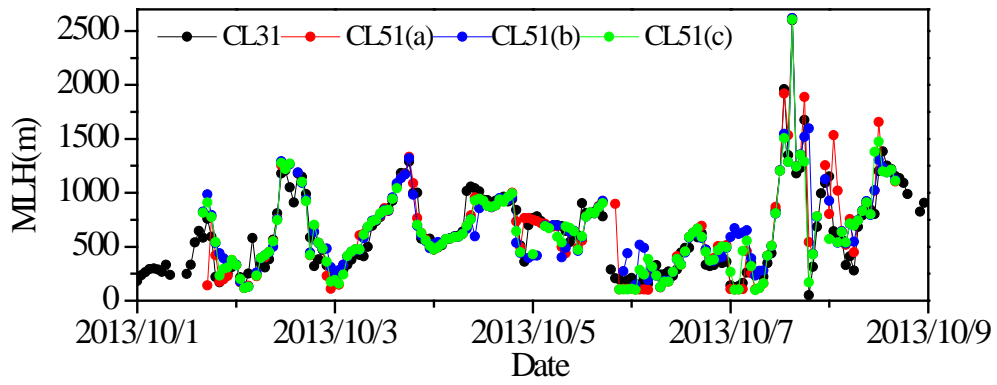


Fig. S1 Comparison between the MLH measured by CL31 and by CL51 (a), CL51 (b) and CL51(c).

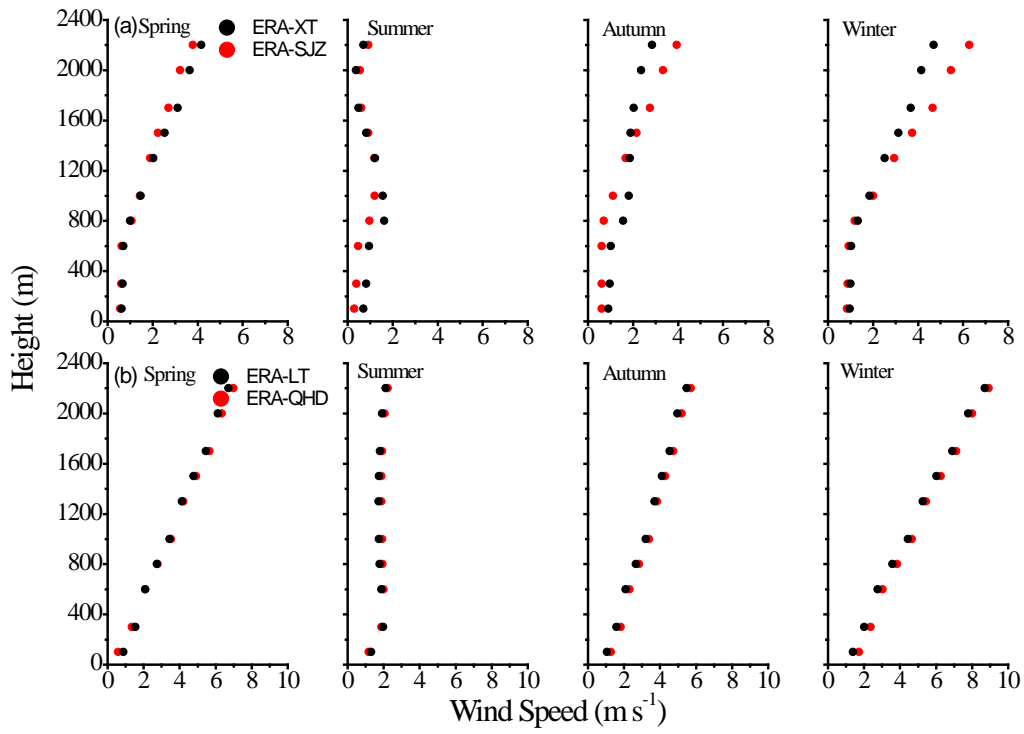


Fig. S2 Comparisons of the wind speed profile between (a) the XT and SJZ stations and (b) the LT and QHD stations with reanalysis data.

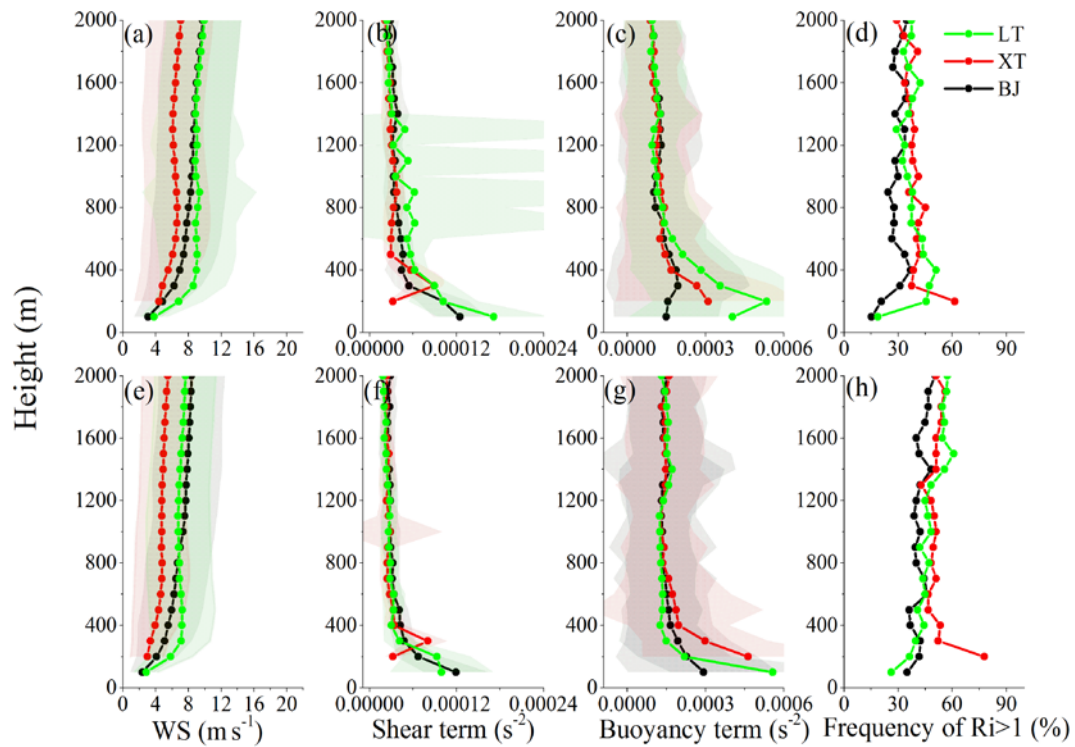


Fig.S3 Vertical profiles of (a, e) horizontal WS, (b, f) shear term, (c, g) buoyancy term and (d, h) frequency of $Ri > 1$ at the BJ, XT and LT stations in spring (upper panel) and autumn (lower panel).

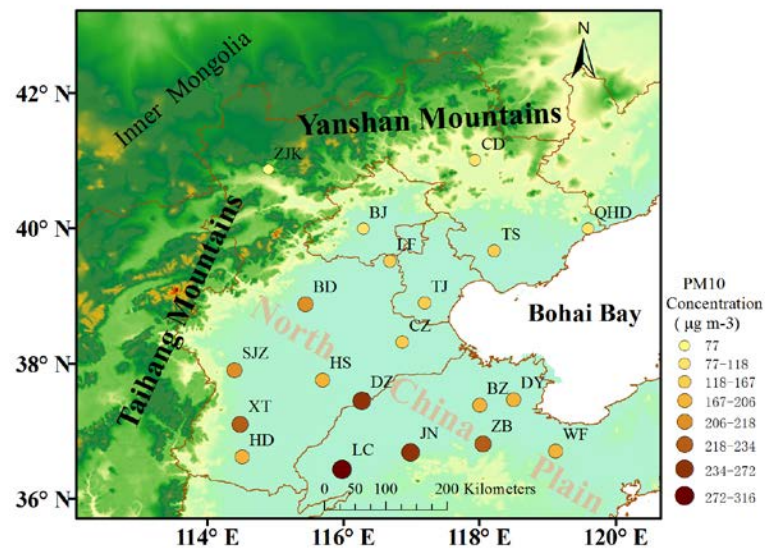


Fig. S4 Distributions of PM₁₀ concentrations at the NCP. The PM₁₀ observation sites (ZJK, CD, BJ, QHD, TJ, LF, TS, CZ, BD, SJZ, HS, XT, HD, DZ, LC, JN, BZ, DY, ZB and WF) are marked in the map with black abbreviations. The sizes and colors of the circular marks are representative of the annual means of near-ground PM₁₀ concentrations; the larger and darker the circle is, the larger the concentrations is.

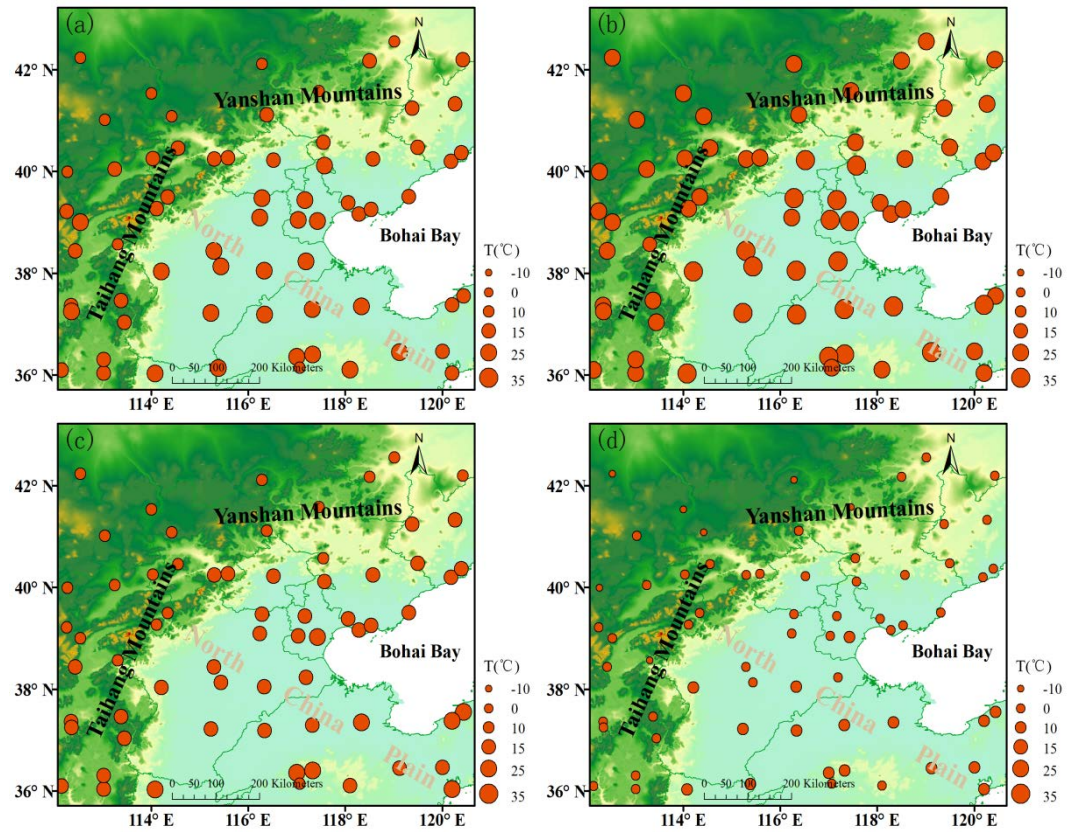


Fig. S5 Seasonal distributions of T in the NCP: (a) spring, (b) summer, (c) autumn and (d) winter.

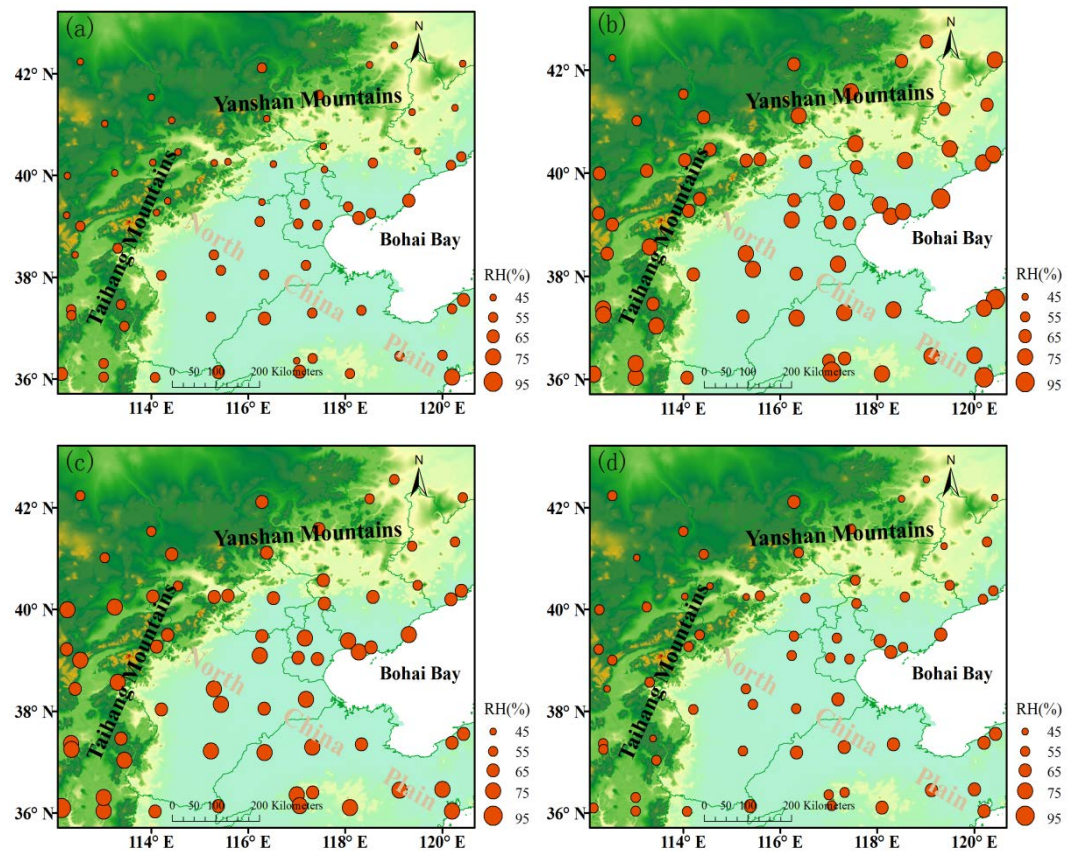


Fig. S6 Seasonal distributions of RH in the NCP: (a) spring, (b) summer, (c) autumn and (d) winter.

and (d) winter.