

1 **Assessment of inter-city transport of particulate**
2 **matter in the Beijing-Tianjin-Hebei region**

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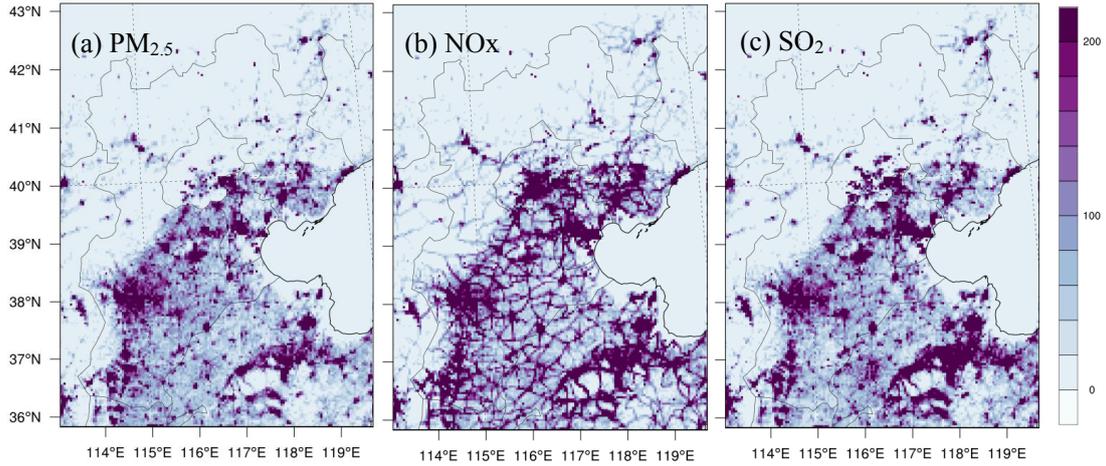
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16 **1. Spatial distribution of emission**

17 Figure S1 shows the spatial distribution of three main pollutants, i.e. PM_{2.5},
18 NO_x and SO₂, in the BTH region. The emissions are allocated into grids
19 with GDP, population or road patterns, based on different emission sectors.



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21 **Figure S1 Spatial distribution of the emission of (a) PM_{2.5}, (b) NO_x and (c) SO₂ in**
 22 **the 4-km grid covering the BTH region. Units are all in t year⁻¹ grid⁻¹**

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24 **2. Evaluation of the meteorology simulation**

25 The simulated meteorological fields are evaluated by the observation data
 26 in the BTH region. The observational data of meteorology are from the
 27 National Climatic Data Center (NCDC) of NOAA (www.ncdc.noaa.gov),
 28 where observations of every 3 hours in 78 international exchange sites in
 29 the BTH region are provided. The statistical indices used for evaluation
 30 include the bias and gross error (GE) between observation and simulation
 31 with regard to wind speed at 10 m, temperature at 2 m, and specific
 32 humidity at 2 m. The bias and GE are defined as

$$33 \quad \text{bias} = \frac{\sum_1^n (\text{SIM} - \text{OBS})}{n} \quad (1)$$

$$34 \quad \text{GE} = \frac{\sum_1^n |\text{SIM} - \text{OBS}|}{n} \quad (2)$$

35 where n is the total number of observation and simulation data pairs, and
 36 SIM and OBS stand for individual simulated and observed values

37 respectively. The parameters evaluated include wind speed at 10 m (W10),
 38 temperature at 2 m (T2), and specific humidity at 2 m (Q2). The results are
 39 shown in Table S1.

40 **Table S1 Comparison of simulated and observed meteorology parameters.**

Parameter	Indice	Unit	Benchmark ^a	Jan-2012	Jul-2012
Wind speed 10 m	Observation Mean	m s ⁻¹	-	2.34	2.32
	Simulation Mean	m s ⁻¹	-	2.59	2.51
	Bias	m s ⁻¹	≤±0.5	-0.24	-0.20
	Gross error	m s ⁻¹	≤2	1.12	1.08
Temperature 2 m	Observation Mean	K	-	266.1	298.0
	Simulation Mean	K	-	266.2	297.8
	Bias	K	≤±0.5	-0.13	0.22
	Gross error	K	≤2	1.64	1.72
Humidity (mixing ratio) 2 m	Observation Mean	g kg ⁻¹	-	1.23	14.80
	Simulation Mean	g kg ⁻¹	-	1.36	14.56
	Bias	g kg ⁻¹	≤±1	-0.13	0.23
	Gross error	g kg ⁻¹	≤2	0.29	1.53

41 a. The benchmarks used in this study are suggested by [Emery \(2011\)](#)

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43 **3. Comparison of the simulation and observation results for** 44 **the major components of PM_{2.5}**

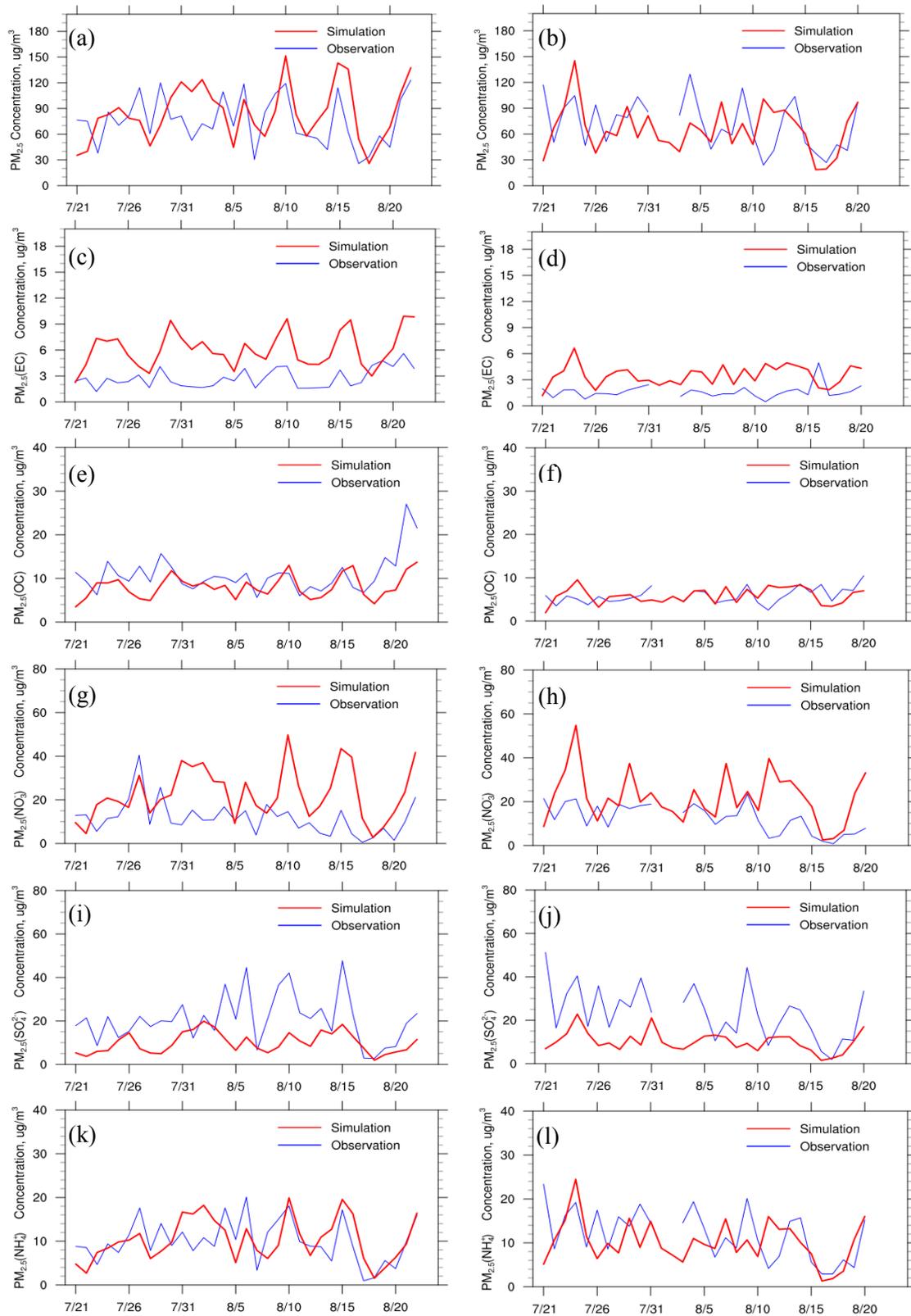
45 The simulation results of the major components of PM_{2.5} are compared
 46 with observations in Ling County and Xiong County from Jul. 22nd to Aug.

47 23rd. The results are shown in Figure S1. Some statistical indices including
 48 NMB and NME are calculated, as is shown in Table S2.

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50 **Table S2 Comparison of simulated and observed PM_{2.5} and its major components**
 51 **in two sites from Jul, 22nd to Aug. 23rd, 2013.**

Jul 22 ~ Aug 23, 2013		Observation	Simulation	NMB	NME
		Mean	Mean		
Unit		$\mu\text{g}\cdot\text{m}^{-3}$	$\mu\text{g}\cdot\text{m}^{-3}$	%	%
	Total PM _{2.5}	75.5	84.5	+11.9	36.9
	EC	2.76	6.07	+120	123.3
Xiong County	OC	10.88	8.12	-25.4	33.0
	Nitrate	11.6	22.7	+95.2	114.0
	Sulfate	20.7	9.87	-52.3	55.5
	Ammonium	10.1	10.3	+2.4	38.6
	Total PM _{2.5}	73.9	64.5	-7.5	37.4
	EC	1.70	3.43	+117	132.3
Ling County	OC	6.09	5.76	-1.2	32.4
	Nitrate	12.3	21.4	+78.6	92.1
	Sulfate	24.6	10.0	-56.6	58.6
	Ammonium	12.3	9.99	-14.2	40.8



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53 **Figure S2 Time series of the simulation and observation of (a, b) PM_{2.5}, and its**
 54 **five major components: (c, d) EC, (e, f) OC, (g, h) nitrate, (i, j) sulfate and (k,**

55 **Ammonium in Xiong County (left) and Ling County (right) during Jul. 22nd to**
56 **Aug. 23rd, 2013.**

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59 **References**

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