Supporting information for:

Development of a High-Resolution Integrated Emission Inventory of Air Pollutants for China

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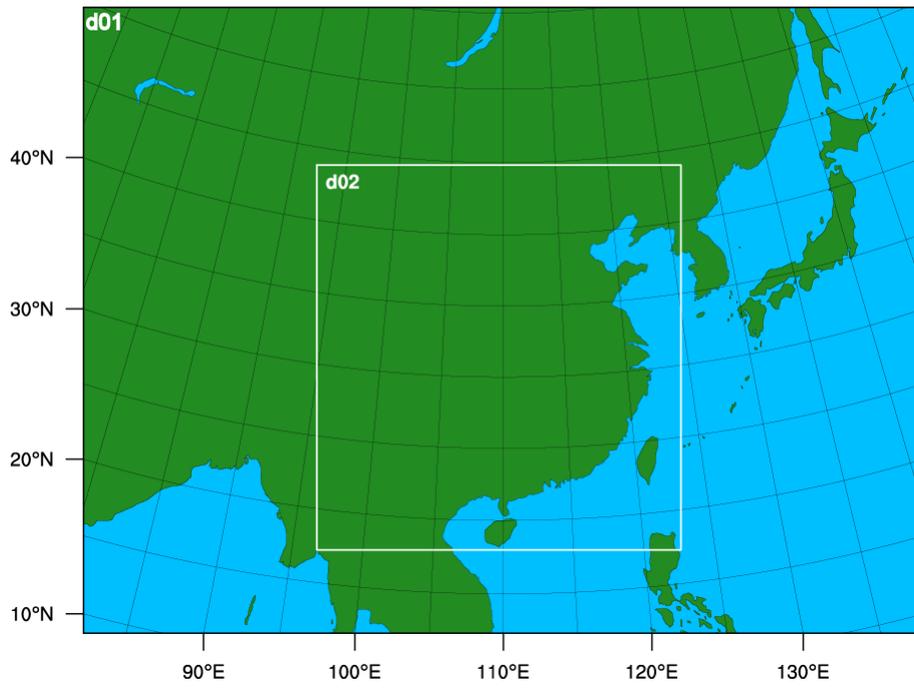
21 **Figure S1: Two nested domains in this study.** The first domain (D01) covers the entire China and parts of neighboring countries, and the
22 second domain (D02) covers the Eastern China.

Table S1: Evaluation of simulated temperature, relative humidity, wind speed, and wind direction for D01 in 2017.

Variable	Month	Sample	Mean_obs	Mean_sim	Corr	MB	RMSE	NMB(%)	NME(%)
Temperature (℃)	1	425737	277.1	276.5	0.98	-0.6	2.3	3.2	-0.2
	2	398617	279	278.2	0.97	-0.8	2.3	3.2	-0.3
	3	444709	282.9	281.9	0.96	-0.9	2.3	3.3	-0.3
	4	430935	289.1	288.1	0.95	-1	2.2	3.1	-0.3
	5	443495	293.4	292.6	0.93	-0.8	2.1	3	-0.3
	6	423895	295.6	295	0.92	-0.6	1.9	2.8	-0.2
	7	432868	298.8	298.1	0.89	-0.7	1.9	2.6	-0.2
	8	437872	298	297.4	0.92	-0.6	1.7	2.5	-0.2
	9	430728	294.8	294.2	0.94	-0.6	1.8	2.5	-0.2
	10	448579	289.5	289.1	0.97	-0.4	1.8	2.5	-0.1
	11	431392	283.4	283	0.98	-0.4	1.9	2.7	-0.1
	12	445121	278	277.5	0.98	-0.5	2.1	2.9	-0.2
Relative Humidity (%)	1	425354	68	72.1	0.77	4.1	10	13.2	6
	2	398268	64.1	69.3	0.78	5.1	10.6	13.9	8
	3	444073	64.4	70	0.8	5.6	10.8	14.3	8.6
	4	429336	63.4	68.7	0.84	5.3	10.3	13.9	8.4
	5	443006	65	68.8	0.86	3.8	9.5	12.7	5.9
	6	423251	71	73.4	0.85	2.4	8.7	11.6	3.4
	7	432151	75.9	78.4	0.84	2.5	8.1	10.7	3.3
	8	437176	76.7	79	0.82	2.3	7.9	10.4	3
	9	429720	73.9	76	0.85	2.1	8.1	10.8	2.9
	10	447503	73.5	75.4	0.85	1.9	8.0	10.7	2.5
	11	430711	68.9	72	0.82	3.1	8.9	11.9	4.5
	12	444518	66.5	70.7	0.81	4.2	9.5	12.5	6.3
Wind Speed (m/s)	1	404082	2.8	3.2	0.6	0.4	1.6	2.2	14.9
	2	381158	2.9	3.3	0.62	0.3	1.6	2.1	11.7
	3	428428	2.7	2.9	0.59	0.2	1.4	1.9	6
	4	418972	3	3.1	0.63	0.1	1.5	1.9	2.3
	5	431251	2.7	2.7	0.62	0	1.3	1.8	-1
	6	410320	2.6	2.6	0.56	0	1.3	1.7	-1
	7	417858	2.4	2.4	0.53	0	1.3	1.7	-1.9
	8	424714	2.5	2.5	0.58	0	1.3	1.7	-1
	9	417017	2.5	2.5	0.63	0.1	1.3	1.7	2.8
	10	429166	2.7	2.8	0.67	0.2	1.4	1.9	5.8
	11	416456	2.7	2.9	0.64	0.2	1.4	1.9	7.7
	12	428713	2.8	3.1	0.66	0.3	1.5	2	10.5

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Variable	Month	Sample	Mean_obs	Mean_sim	Corr	MB	RMSE	NMB(%)	NME(%)
	1	344078	207.3	202.5	0.4	-4.8	79.4	125.8	-2.3
	2	325981	210.2	209.2	0.43	-0.9	72.9	117.1	-0.4
	3	368216	202.3	196.1	0.41	-6.3	76.9	121.3	-3.1
	4	363361	198.5	194.1	0.42	-4.4	66.3	106.5	-2.2
	5	368370	192.7	185.7	0.38	-7	70.6	109.8	-3.6
Wind Direction (°)	6	351094	189.9	180.7	0.35	-9.2	71.6	111.2	-4.8
	7	356046	192.7	184.5	0.34	-8.1	67.1	103.5	-4.2
	8	362346	188	171.4	0.38	-16.6	71	111.6	-8.8
	9	349721	194.6	180.1	0.38	-14.5	73.9	115.5	-7.5
	10	357403	183.5	159.8	0.4	-23.6	81.6	129.8	-12.9
	11	351239	203.7	192.2	0.42	-11.5	76.7	122.4	-5.7
	12	365757	211.2	200.4	0.42	-10.8	76.9	123.1	-5.1

Table S2: The discrepancies between simulated NH₄⁺ concentrations and observed values, using MEIC and HIEIC as emission inputs. The observed concentrations are collected from previous studies (Zhang et al., 2019).

	MEIC					HIEIC				
Month	**Obs**	**Sim**	**MB**	**NMB**	**NME**	**Obs**	**Sim**	**MB**	**NMB**	**NME**
	($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)	(%)	(%)	($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)	(%)	(%)
Jan.	12.9	5.9	-7.0	-53	53	12.9	6.4	-6.5	-50	50
Apr.	5.5	4.7	-0.8	-16	25	5.5	3.8	-1.7	-32	32
Jul.	3.4	2.5	-0.9	-26	26	3.4	2.9	0.5	-15	15
Oct.	5.9	5.2	-0.7	-12	33	5.9	5.9	0.0	1	38

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