

Supplement

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Title: Air quality and health benefits from ultra-low emission control policy indicated by continuous emission monitoring: A case study in the Yangtze River Delta region, China

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Figure S2. The locations and sizes (installed capacity) of coal-fired power plants in the YRD region.

Table S1 Evaluation of WRF simulation performance of meteorological parameters in D2.

Parameters		Jan	Apr	Jul	Oct	Benchmark
Wind speed (WS10)	Obs (m/s)	2.69	2.99	2.75	2.43	
	Sim (m/s)	2.80	3.11	2.67	2.52	
	Bias (m/s)	0.12	0.11	-0.08	0.09	
	RMSE (m/s)	0.39	0.43	0.34	0.33	≤ 2.0
	IOA	0.94	0.95	0.97	0.95	≥ 0.6
Wind direction (WD10)	Obs (°)	183.05	177.54	163.67	174.14	
	Sim (°)	161.16	153.44	147.07	145.58	
	Bias (°)	-21.90	-23.32	-16.60	-28.56	≤ 10
Temperature (T2)	Obs (°C)	4.86	15.49	26.21	18.11	
	Sim (°C)	4.96	15.12	25.59	18.22	
	Bias (°C)	0.10	-0.35	-0.62	0.12	≤ 0.5
	RMSE (°C)	0.70	1.06	1.13	0.63	
	IOA	0.99	0.99	0.97	0.99	≥ 0.7
Relative Humidity (RH2)	Obs (%)	66.58	71.04	81.32	71.81	
	Sim (%)	72.93	77.64	82.16	68.61	
	Bias (%)	6.35	6.60	0.84	-3.20	
	RMSE (%)	13.26	10.36	3.55	6.48	
	IOA	0.85	0.89	0.97	0.96	≥ 0.7

Note: The benchmarks of statistical indicators for the meteorological parameters were reported in (Emery, C., Tai, E., and Yarwood, G.: Enhanced meteorological modeling and performance evaluation for two Texas episodes, Report to the Texas Natural Resources Conservation Commission, prepared by ENVIRON, International Corp, Novato, CA, 2001). The Bias, IOA and RMSE were calculated using the following equations (P , O and \bar{O} represent the simulation, observation, and averaged observation value, respectively):

$$Bias = \frac{1}{n} \sum_{i=1}^n (P_i - O_i); \quad IOA = 1 - \frac{\sum_{i=1}^n (P_i - O_i)^2}{\sum_{i=1}^n (|P_i - \bar{O}_i| + |O_i - \bar{O}_i|)^2}; \quad RMSE = \sqrt{\frac{1}{n} \sum_{i=1}^n (P_i - O_i)^2}$$

Table S2 The air pollutant emissions by sector for Cases 1-5 (Unit: Gg).

Case	Power			Industry			Residential			Transportation			Total		
	SO ₂	NO _x	PM	SO ₂	NO _x	PM	SO ₂	NO _x	PM	SO ₂	NO _x	PM	SO ₂	NO _x	PM
Case 1	606.8	863.4	376.2	1305.5	1294.6	1817.9	133.5	326.6	787.5	62.0	1847.1	105.9	2107.8	4331.7	3087.4
Case 2	179.4	245.5	45.1	1305.5	1294.6	1817.9	133.5	326.6	787.5	62.0	1847.1	105.9	1680.5	3713.8	2756.4
Case 3	56.0	110.0	8.8	1305.5	1294.6	1817.9	133.5	326.6	787.5	62.0	1847.1	105.9	1557.0	3578.4	2720.0
Case 4	56.0	110.0	8.8	249.4	426.8	539.6	133.5	326.6	787.5	62.0	1847.1	105.9	500.9	2710.6	1441.7
Case 5	0.0	0.0	0.0	1305.5	1294.6	1817.9	133.5	326.6	787.5	62.0	1847.1	105.9	1501.0	3468.4	2711.2

Table S3 The fractions of males and females by region in the YRD for 2015.

Province or city	Male	Female
Anhui	0.51	0.49
Shanghai	0.50	0.50
Jiangsu	0.50	0.50
Zhejiang	0.51	0.49

Table S4 The baseline mortalities (y_0 , cases/105) by age group in China.

Age (year)	IHD		STK		COPD		LC	
	Male	Female	Male	Female	Male	Female	Male	Female
25-29	5.9	2.1	4.9	1.8	0.7	0.4	1.1	0.6
30-34	9.7	3.1	7.8	2.9	1	0.7	2.5	1.3
35-39	15.3	5	13.6	5.8	1.8	1.1	4.7	2.9
40-44	26.7	9.2	27.3	13.2	3.8	2.3	10.9	6.1
45-49	45.2	16.4	52.2	27	7.5	4.1	25.4	11.4
50-54	77.5	29.7	100.3	52.8	17.5	8.9	55.4	21.7
55-59	125.8	50.2	176.6	89.2	39.3	18.6	102.9	35.4
60-64	215.1	99	326.5	165.4	97.8	46.2	180.3	57.1
65-69	372.6	182.9	571.1	300.5	221.6	105.2	270.5	83.1
70-74	615	364	996.8	553.3	494.7	238.5	381.2	126.3
75-79	1050.4	676.3	1648.7	993.2	910.6	475.1	495.2	175.5
80+	2865.5	2551.6	3551.5	3037.6	2459	1782.1	622	268.7

Table S5 The life expectancy by age group in China.

Age (year)	Male	Female
<1	74.8	77.7
1-4	74.5	77.4
5-9	70.6	73.5
10-14	65.7	68.6
15-19	60.8	63.7
20-24	55.9	58.8
25-29	51.1	53.9
30-34	46.2	49.0
35-39	41.5	44.2
40-44	36.7	39.4
45-49	32.0	34.6
50-54	27.3	29.9
55-59	22.9	25.3
60-64	18.6	20.9
65-69	14.8	16.8
70-74	11.4	13.2
75-79	8.7	10.0
80-84	6.7	7.5
85-89	4.9	5.5
90-94	3.7	4.2
95-99	2.9	3.2
100+	2.4	2.8

Figure S1

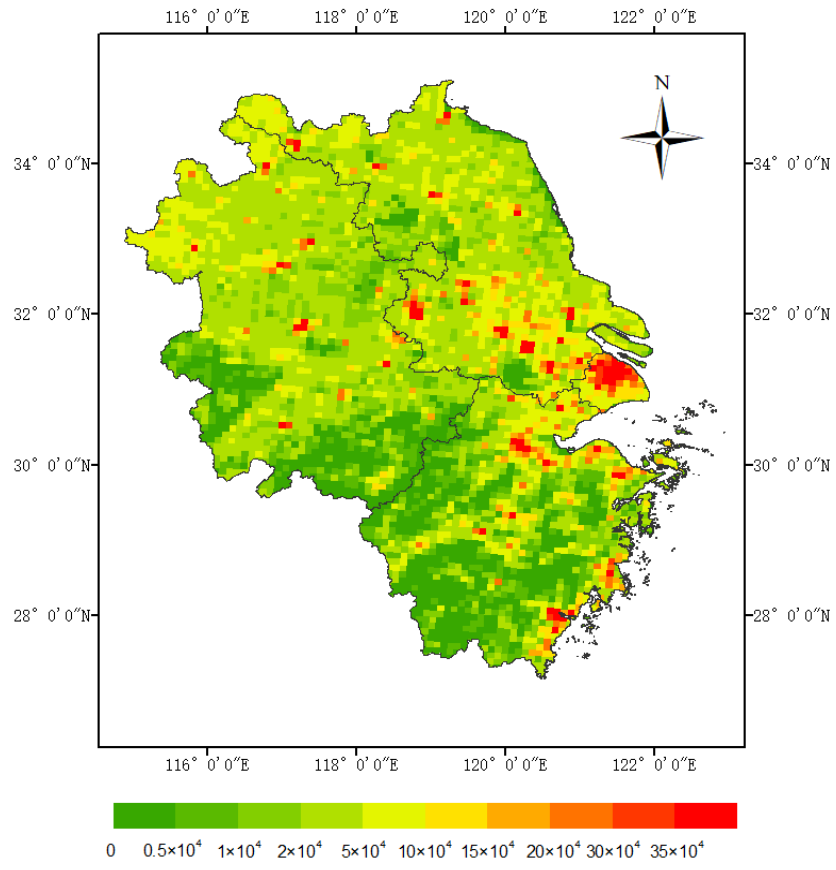


Figure S2

