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Updated emission inventories of power plants in simulating air quality during haze periods over East China

Lei Zhang et al.

Correspondence to: Tianliang Zhao (tlzhao@nuist.edu.cn) and Shaofei Kong (kongshaofei@cug.edu.cn)

Figure S1 Spatial distributions of power plant emissions of MEIC (colored grids) and the UEIPP (colored circles) in 2012 (unit: tons); the UEIPP has been mapped into $0.25^{o} \times 0.25^{o}$ grids consistent with the spatial resolution of MEIC.

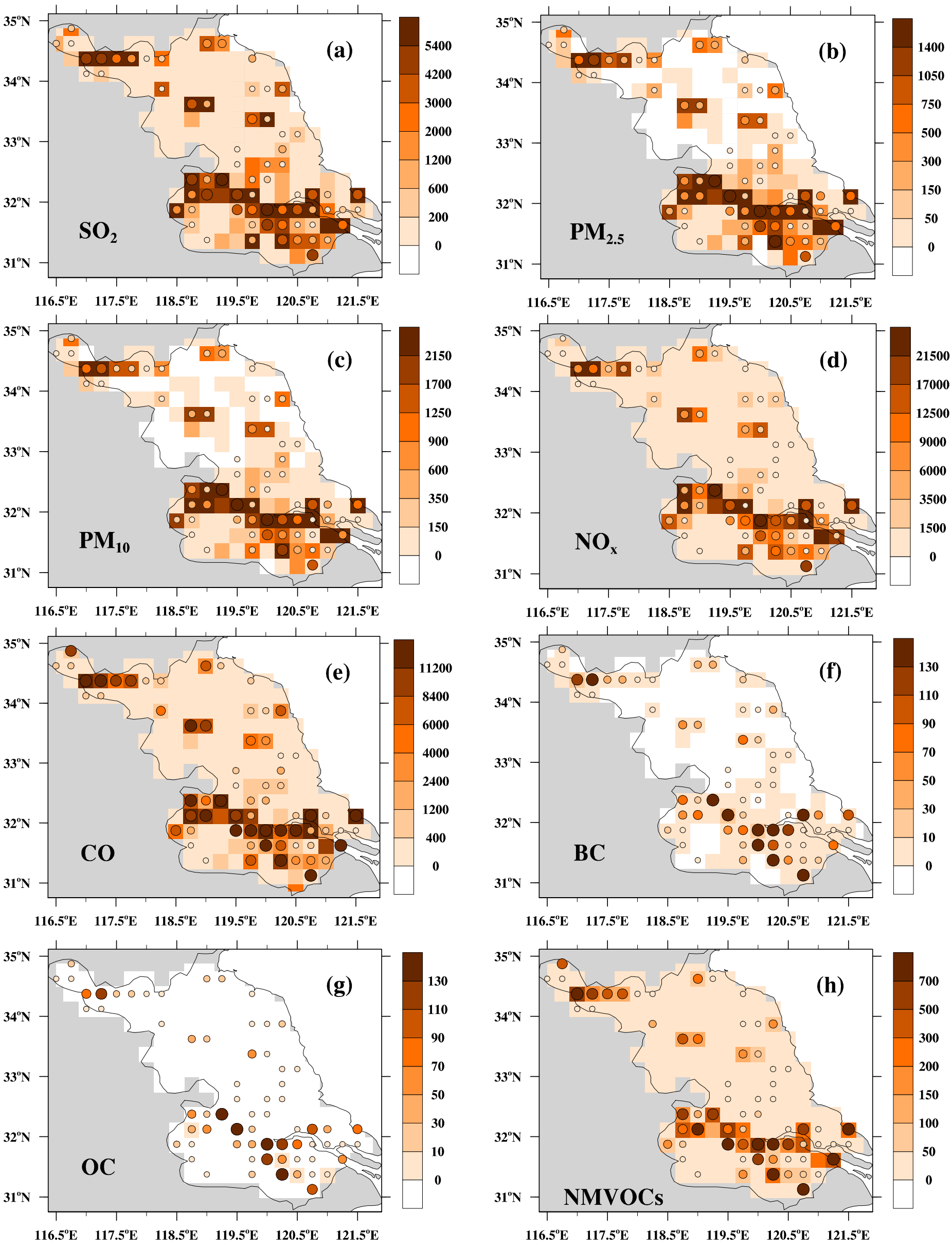


Figure S2. Hourly variations of observed and simulated chemical variable concentrations in the 13 sites (labeled in Fig. 1b).

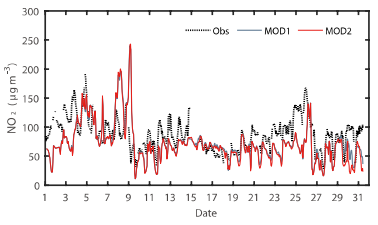
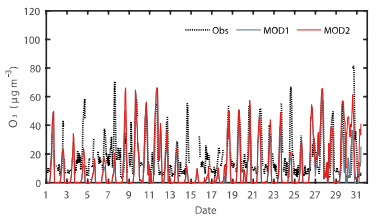
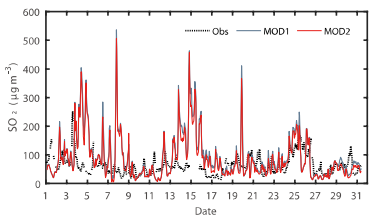
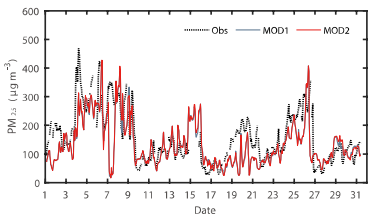
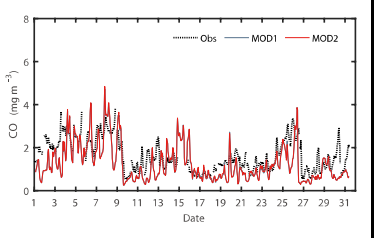
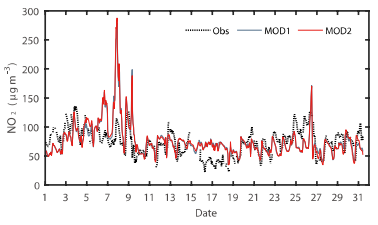
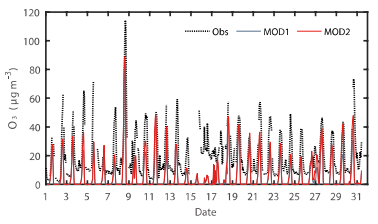
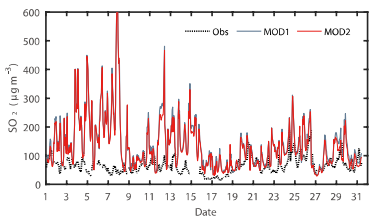
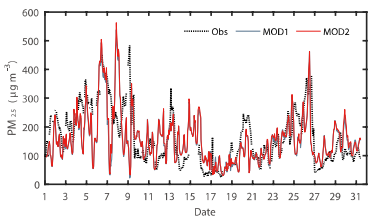
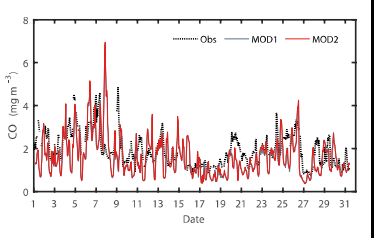
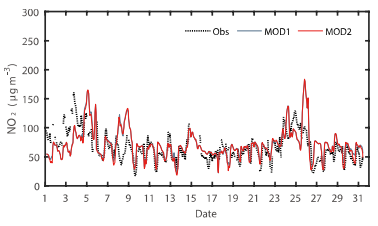
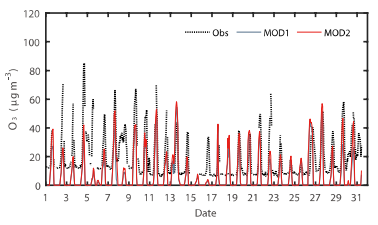
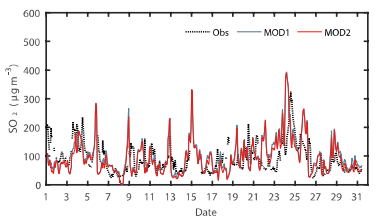
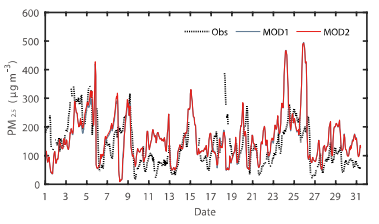
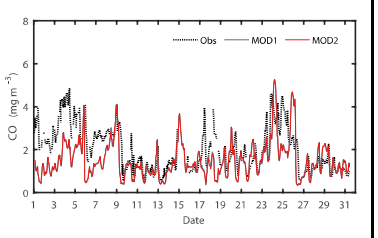
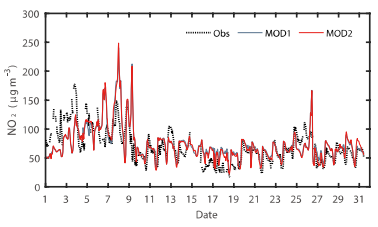
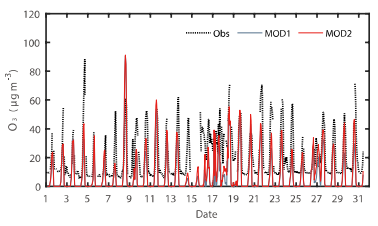
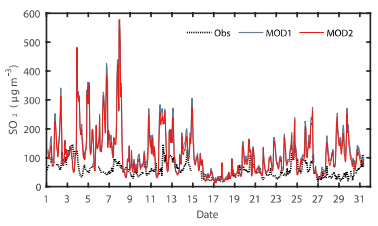
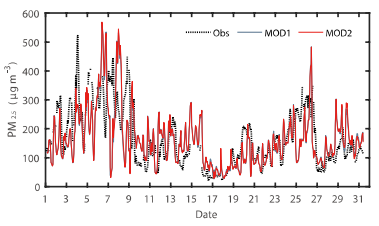
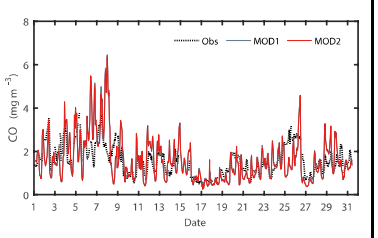
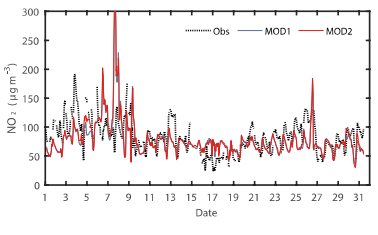
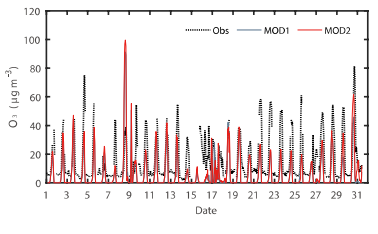
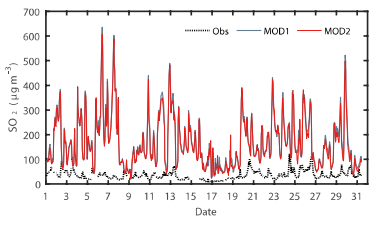
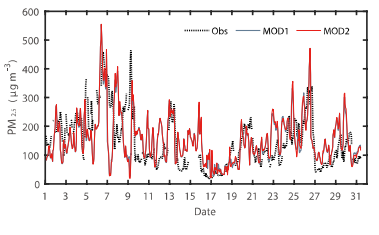
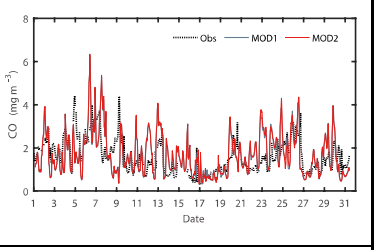
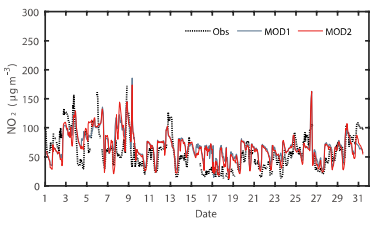
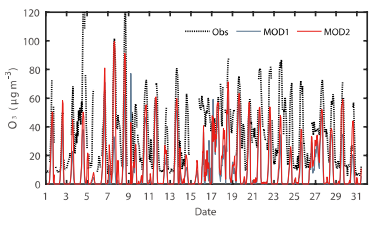
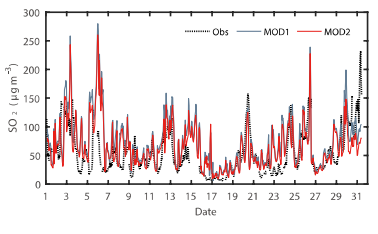
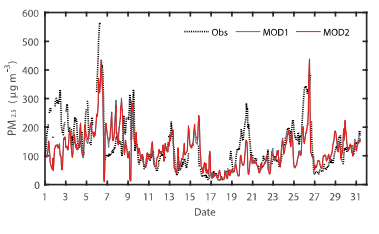
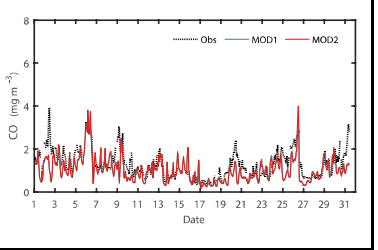
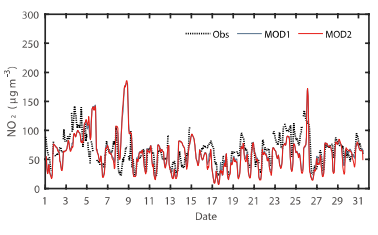
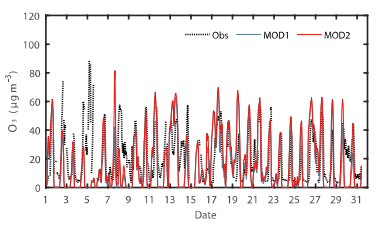
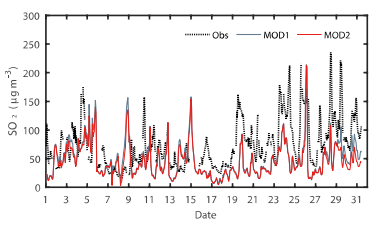
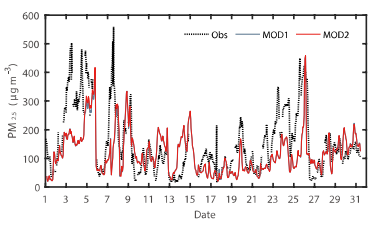
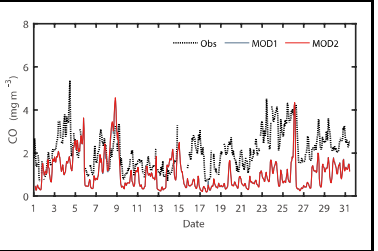
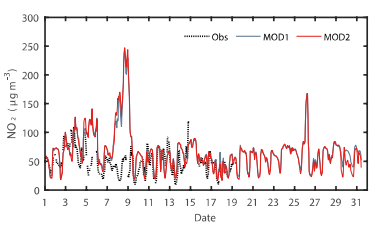
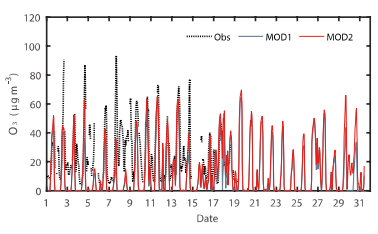
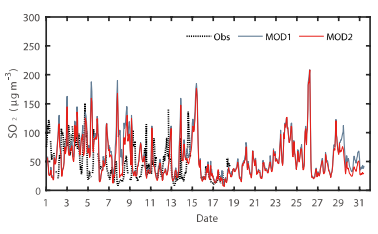
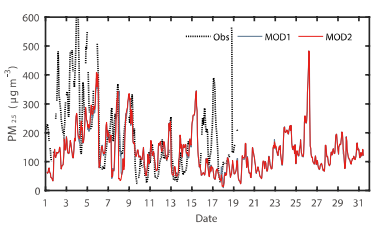
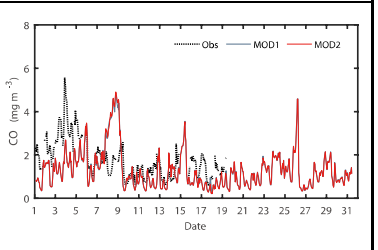
	NO_2	O_3	SO_2	$PM_{2.5}$	CO
Nanjing					
Wuxi					
Xuzhou					
Changzhou					
Suzhou					
Nantong					
Lianyungang					
Huaian					
Yancheng					
Yangzhou					
Zhenjiang					
Taizhou					
Suqian					

Figure S3. Interdiurnal variations of observed and simulated $PM_{2.5}$ chemical composition concentrations at Nanjing site.

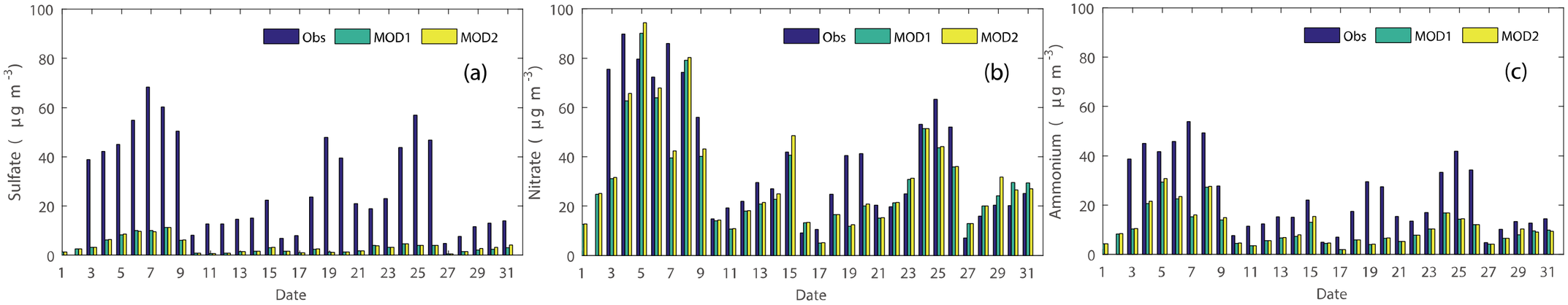


Figure S4. The same as Figure 4 in manuscript but using WRF-Chem/RADM2.

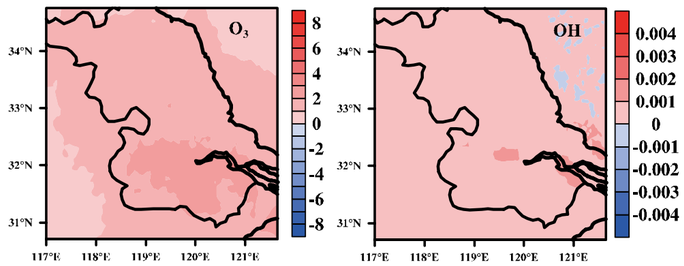


Table S1. Performance statistics of chemical variables between MOD1 and MOD2 during December 2013 in the 13 sites (labeled in Fig. 1b).

	NO_2				O_3				SO_2				$PM_{2.5}$				CO			
	NMB (%)		NME (%)		NMB (%)		NME (%)		NMB (%)		NME (%)		NMB (%)		NME (%)		NMB (%)		NME (%)	
	MOD1	MOD2	MOD1	MOD2	MOD1	MOD2	MOD1	MOD2	MOD1	MOD2	MOD1	MOD2	MOD1	MOD2	MOD1	MOD2	MOD1	MOD2	MOD1	MOD2
Nanjing	−15. 71	−17. 15	31. 32	32. 19	−48. 65	−41. 71	66. 30	63. 81	50. 44	37. 89	90. 04	82. 58	−17. 66	−17. 33	35. 82	35. 80	−22. 16	−21. 87	35. 71	35. 83
Wuxi	6. 15	6. 01	28. 77	28. 99	−71. 18	−66. 77	72. 50	69. 09	119. 59	109. 55	126. 34	117. 94	−6. 66	−5. 00	38. 73	38. 37	−19. 06	−18. 10	36. 71	36. 06
Xuzhou	5. 62	4. 05	27. 10	26. 95	−62. 33	−55. 33	71. 10	68. 34	6. 06	−0. 65	47. 93	47. 58	11. 50	12. 69	46. 46	46. 99	−27. 38	−27. 05	39. 96	39. 82
Changzhou	7. 59	5. 98	29. 54	28. 24	−64. 78	−57. 10	69. 13	63. 92	104. 63	89. 35	114. 08	101. 28	−4. 93	−4. 32	41. 28	41. 19	1. 90	2. 31	38. 28	38. 20
Suzhou	−5. 14	−4. 34	29. 54	29. 12	−63. 60	−59. 29	74. 18	72. 81	393. 83	379. 84	394. 47	380. 70	3. 98	5. 20	45. 15	45. 74	7. 99	9. 33	41. 54	42. 48
Nantong	23. 65	18. 58	39. 26	36. 66	−71. 69	−60. 89	72. 69	63. 00	46. 53	30. 39	64. 65	56. 91	−14. 33	−13. 98	38. 60	38. 53	−19. 09	−18. 97	31. 74	31. 68
Lianyungang	−9. 16	−11. 30	30. 66	32. 36	−17. 96	−8. 56	60. 84	62. 55	−35. 60	−39. 40	51. 73	51. 83	−27. 29	−26. 79	46. 90	46. 65	−51. 93	−51. 62	56. 32	56. 29
Huaian	44. 97	43. 09	57. 33	59. 02	−56. 08	−45. 68	63. 07	60. 17	26. 09	12. 88	68. 09	60. 97	−30. 44	−31. 56	46. 77	47. 67	−24. 65	−24. 46	49. 29	49. 85
Yancheng	30. 80	25. 53	45. 90	44. 31	−55. 51	−48. 21	60. 37	55. 94	−10. 85	−17. 43	50. 03	49. 77	−25. 03	−23. 82	45. 52	45. 61	−34. 63	−34. 84	42. 69	42. 81
Yangzhou	40. 80	39. 53	51. 00	50. 72	−60. 61	−53. 81	66. 94	63. 72	51. 42	36. 07	84. 77	75. 93	−13. 77	−13. 51	38. 48	38. 83	−18. 15	−17. 75	38. 44	38. 97
Zhenjiang	24. 80	16. 18	41. 69	37. 99	−62. 25	−42. 71	66. 48	58. 59	138. 43	95. 69	153. 20	120. 48	−5. 83	−5. 70	41. 42	41. 70	−18. 65	−18. 73	50. 16	50. 60
Taizhou	167. 35	163. 09	167. 98	163. 97	−52. 16	−46. 54	62. 84	59. 87	18. 97	9. 41	64. 67	61. 20	−28. 07	−27. 57	42. 42	42. 02	−39. 42	−39. 26	45. 75	45. 59
Suqian	−27. 53	−28. 25	41. 33	42. 13	−14. 78	−9. 13	64. 55	65. 16	−35. 51	−38. 66	54. 34	54. 66	−12. 58	−12. 06	36. 45	36. 72	−52. 95	−52. 63	57. 13	57. 32
Average	22. 63	20. 08	47. 80	47. 13	−53. 97	−45. 83	67. 00	63. 61	67. 23	54. 22	104. 95	97. 06	−13. 16	−12. 60	41. 85	41. 99	−24. 48	−24. 13	43. 36	43. 50

Equations:

$$R = \frac{1}{M}\sum_{j=1}^{M}\frac{\sum_{i=1}^{N}(P_{ij}-\overline{P_j})(O_{ij}-\overline{O_j})}{\sqrt{\sum_{i=1}^{N}(P_{ij}-\overline{P_j})^2}\sqrt{\sum_{i=1}^{N}(O_{ij}-\overline{O_j})^2}}$$

$$MFB = \frac{1}{N\cdot M}\sum_{i=1}^{N}\sum_{j=1}^{M}(2\cdot\frac{P_{ij}-O_{ij}}{P_{ij}+O_{ij}})\cdot 100\%;$$

$$MFB = \frac{1}{N\cdot M}\sum_{i=1}^{N}\sum_{j=1}^{M}\left|2\cdot\frac{P_{ij}-O_{ij}}{P_{ij}+O_{ij}}\right|\cdot 100\%;$$

$$NMB = \frac{\sum_{i=1}^{N}(P_i-O_i)}{\sum_{i}^{N}O_i}\cdot 100\%;$$

$$NME = \frac{\sum_{i=1}^{N}\left|P_i-O_i\right|}{\sum_{i}^{N}O_i}\cdot 100\%.$$

R: Correlation coefficient;

MFB: Mean fractional bias;

MFE: Mean fractional error;

NMB: Normalized mean bias;

NME: Normalized mean error;

P: Simulation;

O: Observation;

N: Number of measurements;

M: Number of monitoring sites.