Supplement of Atmos. Chem. Phys., 23, 6525–6544, 2023
https://doi.org/10.5194/acp-23-6525-2023-supplement

Atmospheric Chemistry and Physics
Open Access
EGU

Supplement of

The effect of anthropogenic emission, meteorological factors, and carbon dioxide on the surface ozone increase in China from 2008 to 2018 during the East Asia summer monsoon season

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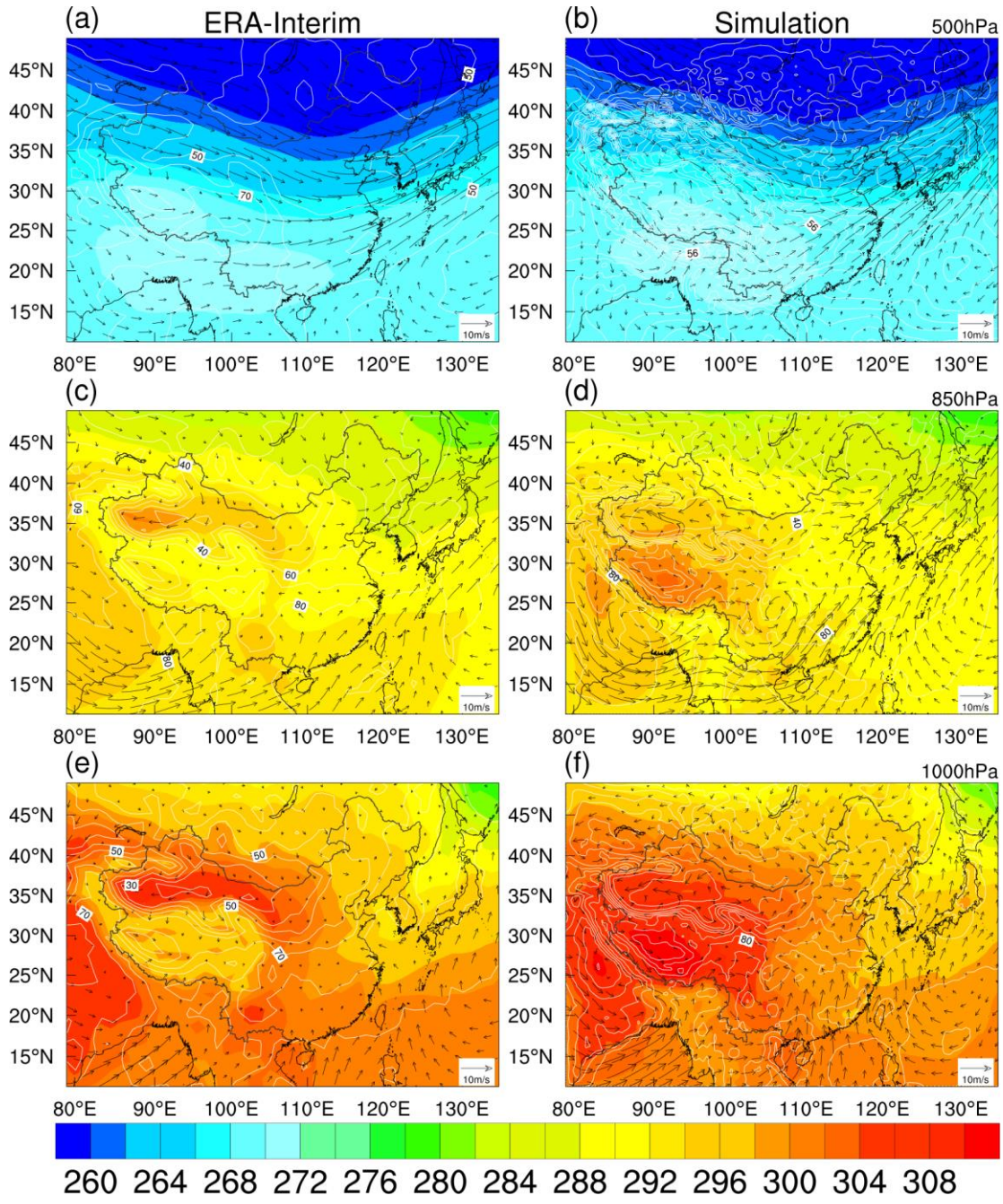


Figure S1. Comparisons between the simulated (a, c) and reanalysis (b, d) mean temperature (shading, units: K), wind (vectors, units: m/s), and relative humidity (contours, units: %) at 500 hPa (a, b), 850 hPa (c, d) and 1000 hPa (e, f) in 2015.

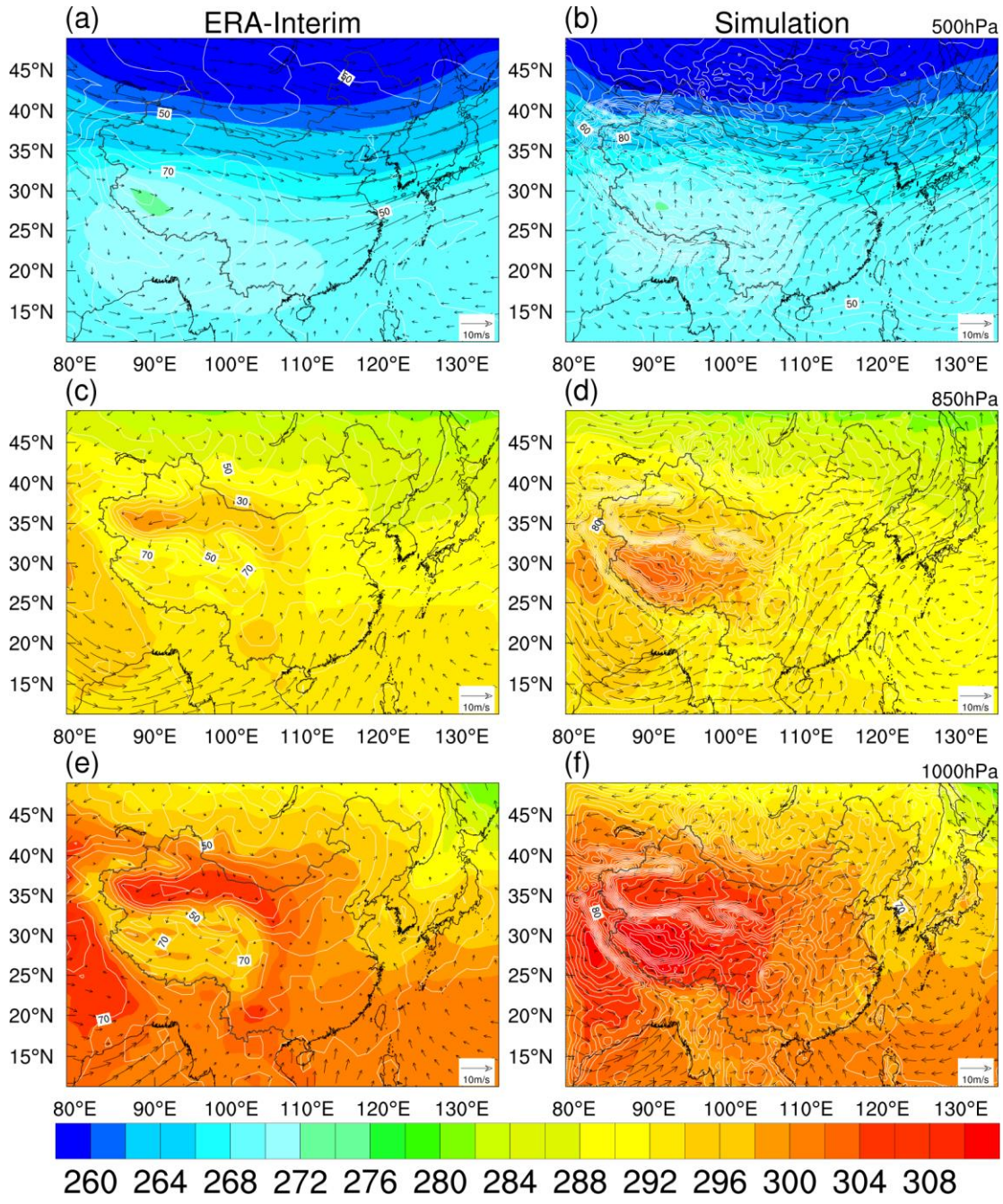


Figure S2. Comparisons between the simulated (a, c) and reanalysis (b, d) mean temperature (shading, units: K), wind (vectors, units: m/s), and relative humidity (contours, units: %) at 500 hPa (a, b), 850 hPa (c, d) and 1000 hPa (e, f) in 2016.

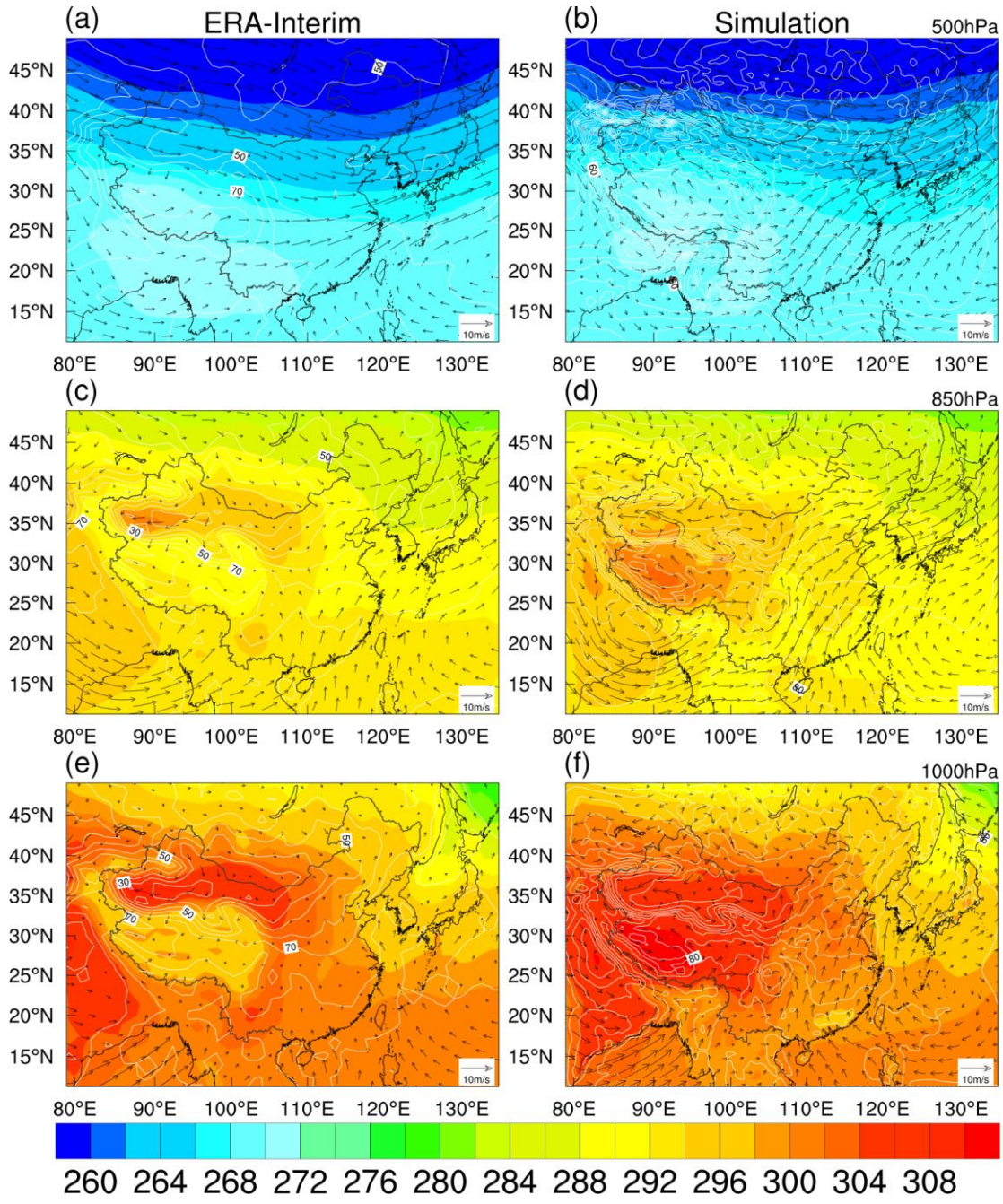


Figure S3. Comparisons between the simulated (a, c) and reanalysis (b, d) mean temperature (shading, units: K), wind (vectors, units: m/s), and relative humidity (contours, units: %) at 500 hPa (a, b), 850 hPa (c, d) and 1000 hPa (e, f) in 2017.

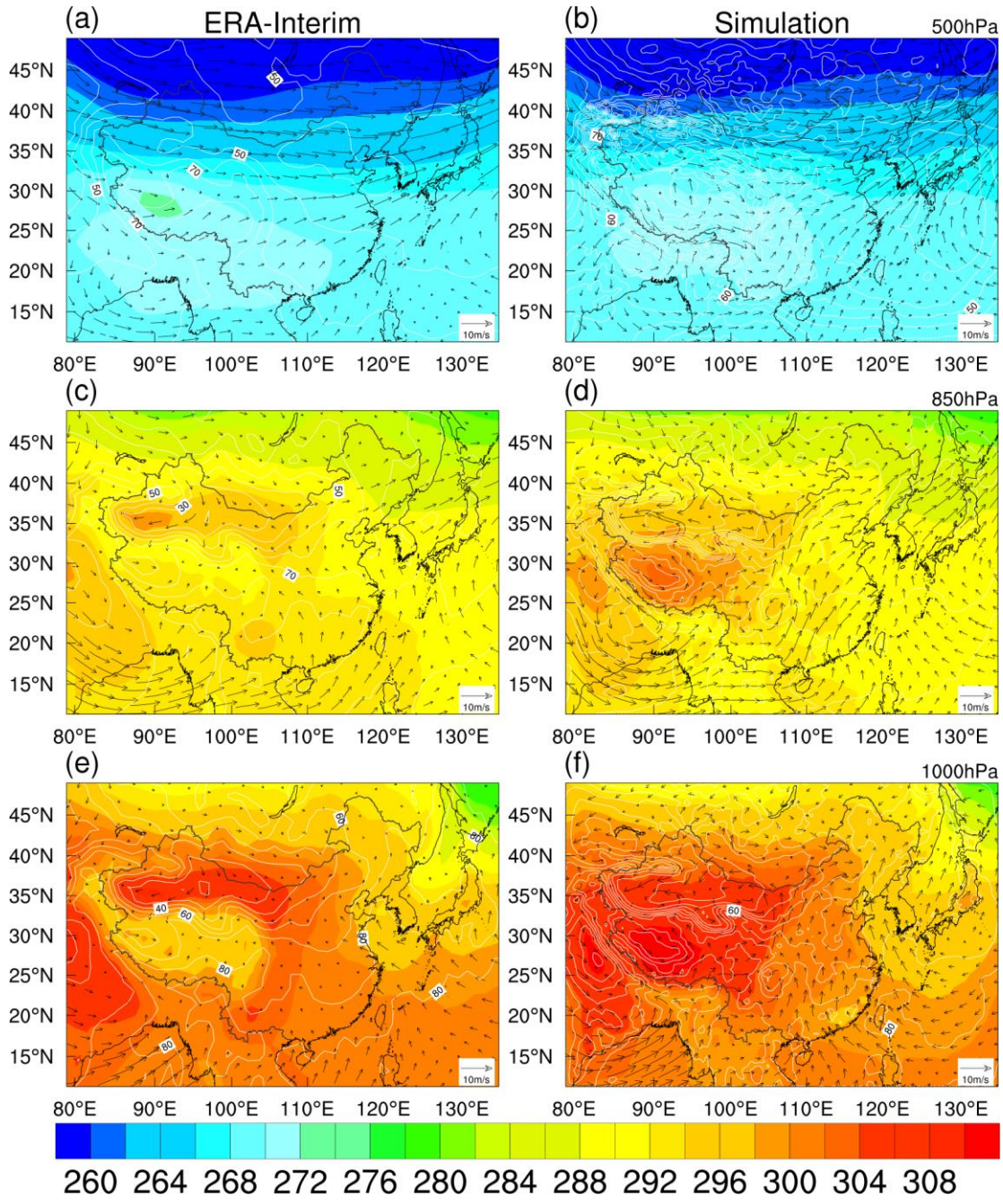


Figure S4. Comparisons between the simulated (a, c) and reanalysis (b, d) mean temperature (shading, units: K), wind (vectors, units: m/s), and relative humidity (contours, units: %) at 500 hPa (a, b), 850 hPa (c, d) and 1000 hPa (e, f) in 2018.

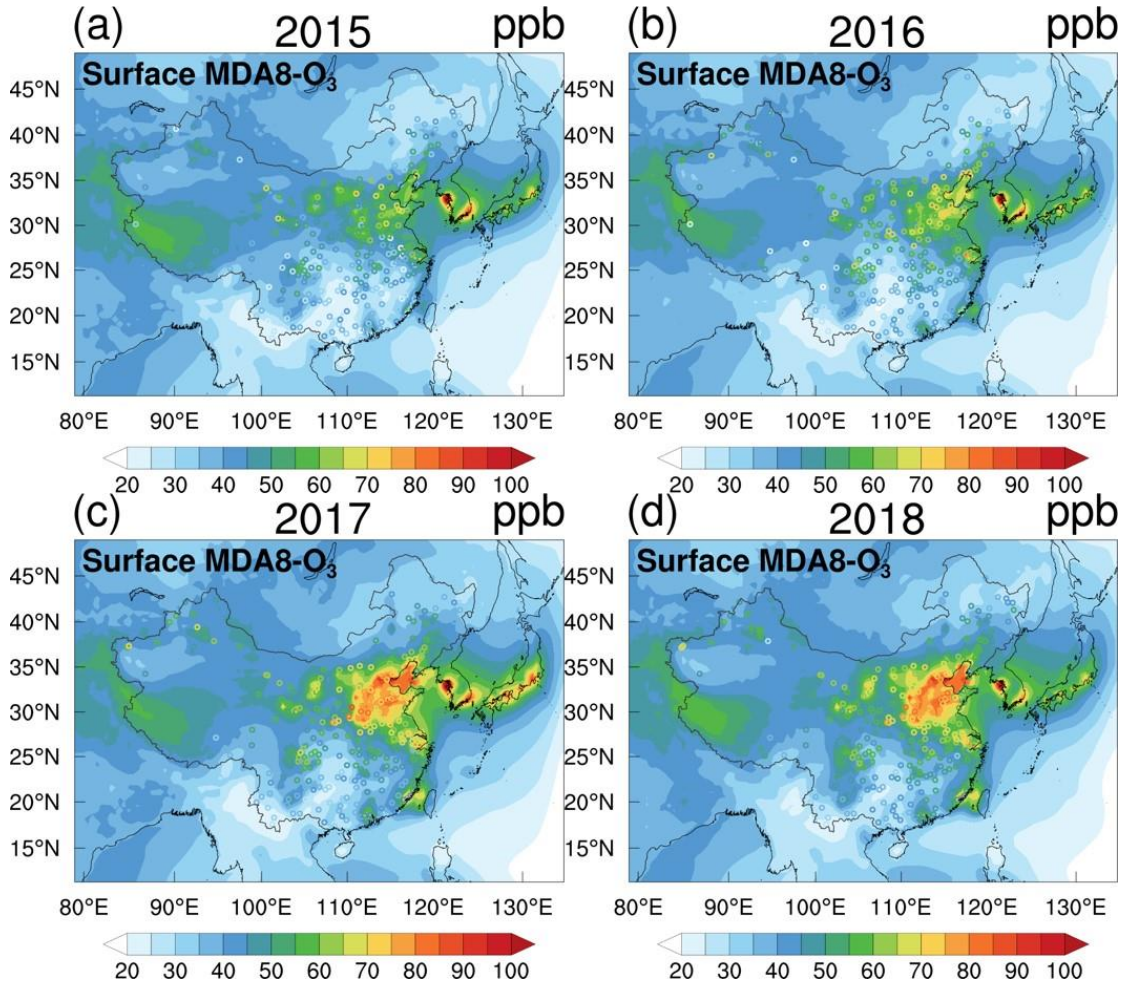


Figure S5. Comparisons between the simulated and observed surface MDA8 O_3 concentrations (units: ppb) during the summer monsoon period in (a)2015, (b)2016, (c)2017, (d)2018. Colored circles represent the observations.

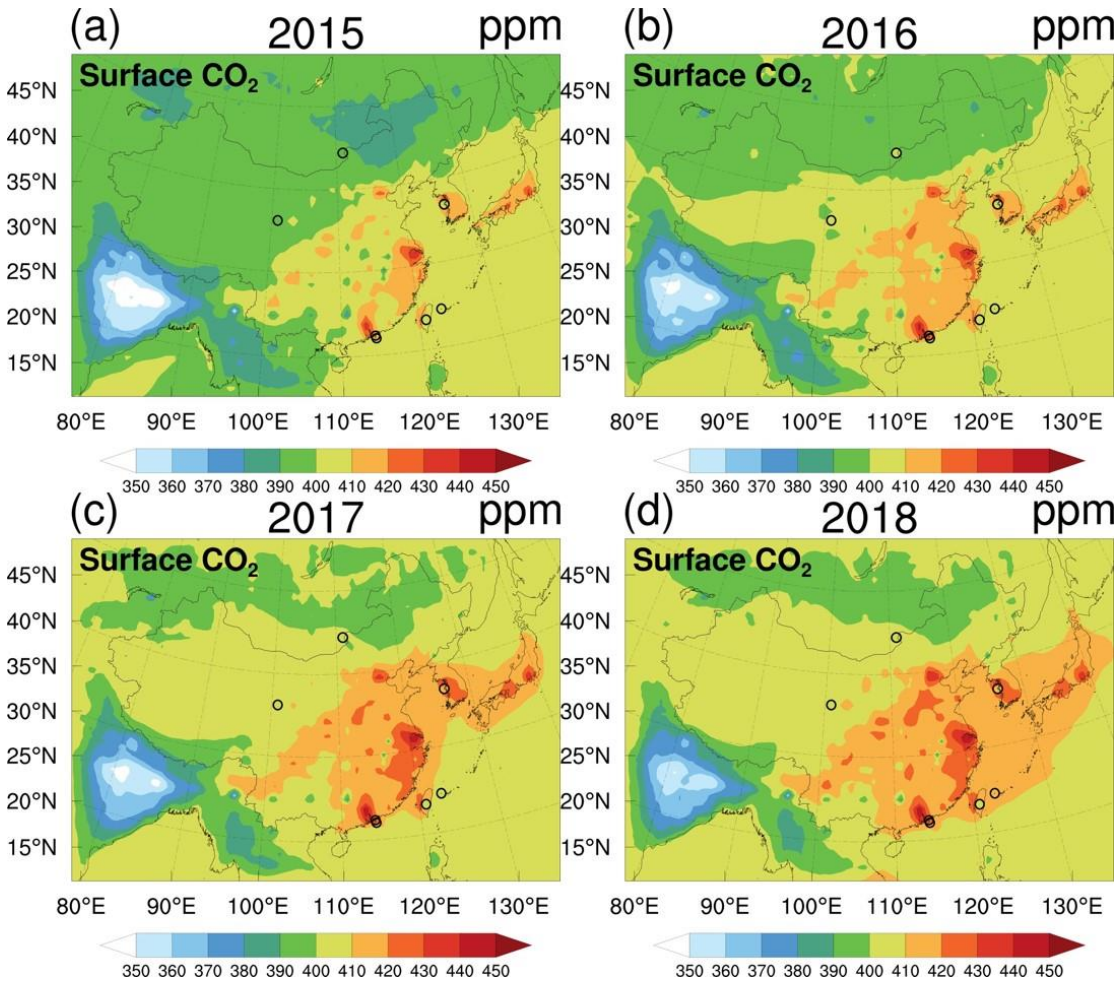


Figure S6. Comparisons between the simulated and observed surface CO_2 concentrations (units: ppm) during the summer monsoon period in (a)2015, (b)2016, (c)2017, (d)2018.

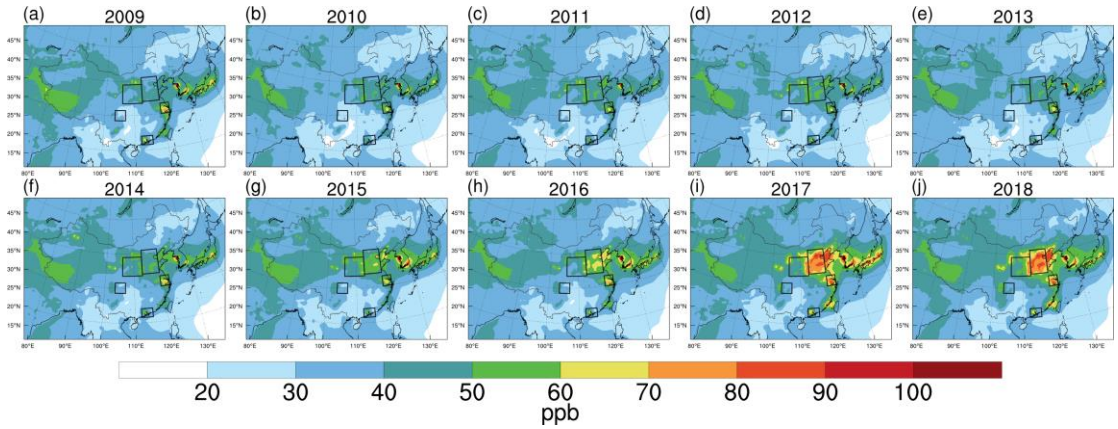
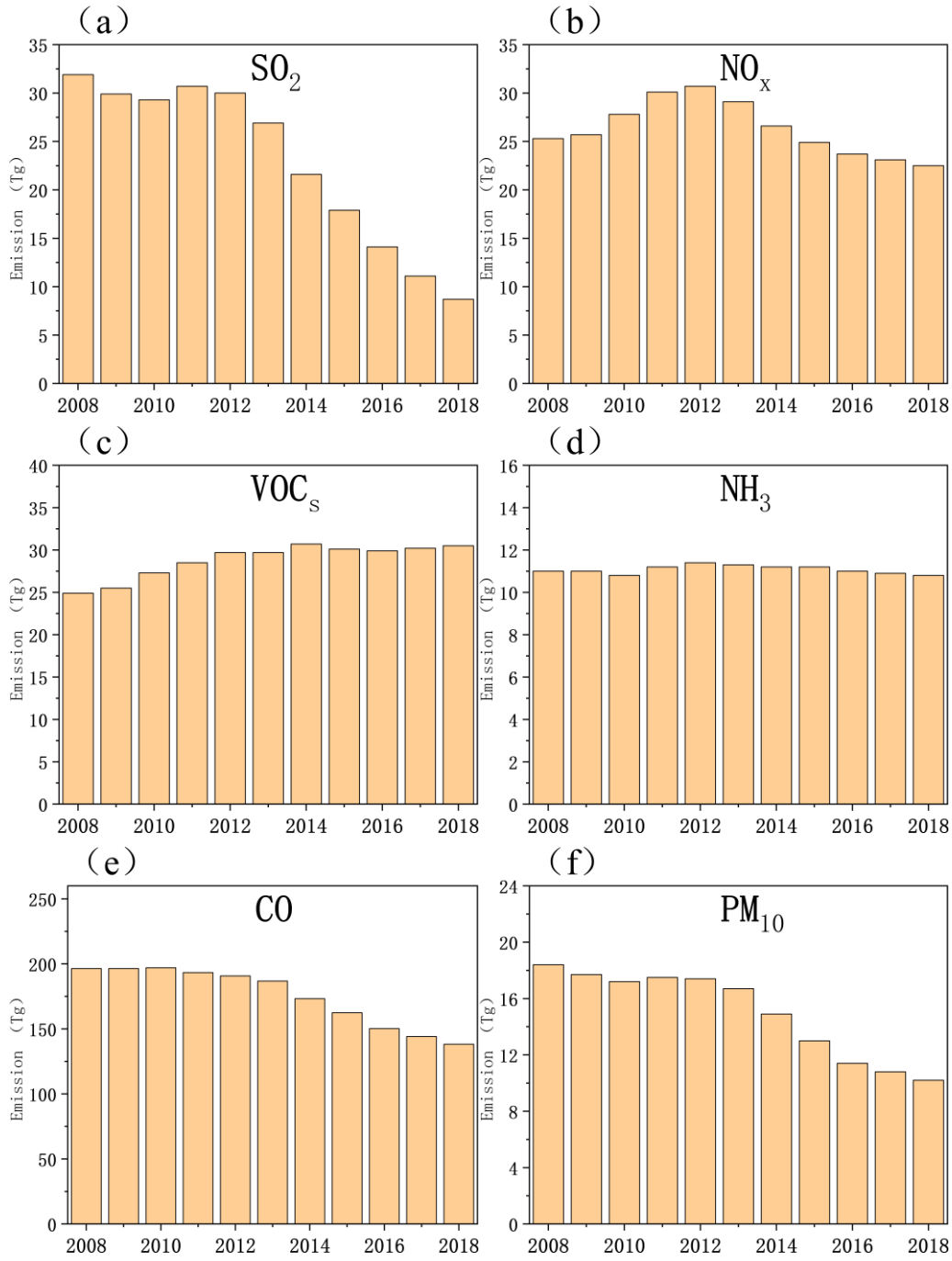


Figure S7. Simulated surface MDA8 O_3 concentrations (units: ppb) in the summer monsoon period of 2009 (a), 2010 (b), 2011 (c), 2012 (d), 2013 (e), 2014 (f), 2015 (g), 2016 (h), 2017 (i) and 2018 (j).


(a)
SO2
(b)
NOx
(c)
VOCs
(d)
NH3
(e)
CO
(f)
PM10
Emission (Tg)
2008
2010
2012
2014
2016
2018

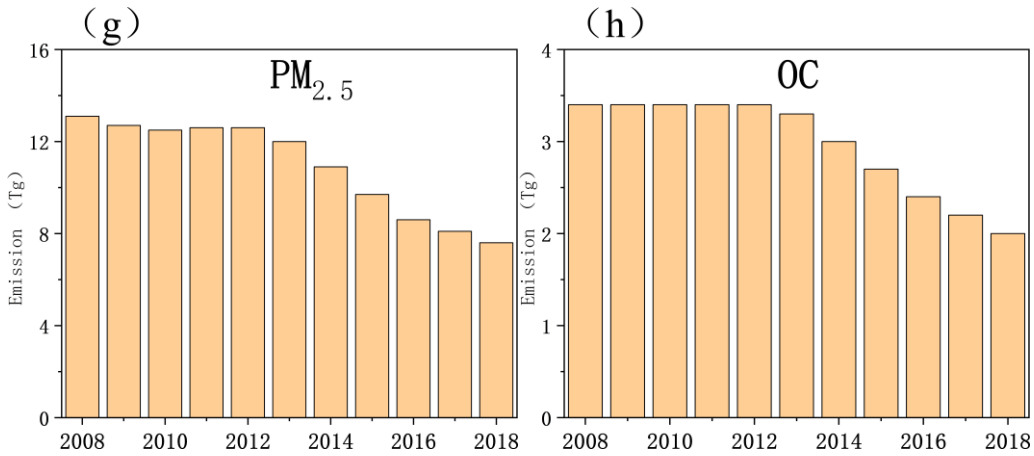


Figure S8. Changes in the anthropogenic emissions (Tg) from 2008 to 2018. The species include (a)SO_2, (b)NOx, (c)VOCs, (d)NH_3, (e)CO, (f)PM_{10}, (g)$PM_{2.5}$, (h)OC.

Table S1. Changes in the model domain's anthropogenic emissions (Tg) from 2008 to 2018

Year	SO_2	NO_X	VOCs	NH_3	CO	PM_{10}	$PM_{2.5}$	OC
2008	31.9	25.3	24.9	11.0	196.4	18.4	13.1	3.4
2009	29.9	25.7	25.5	11.0	196.4	17.7	12.7	3.4
2010	29.3	27.8	27.3	10.8	197.0	17.2	12.5	3.4
2011	30.7	30.1	28.5	11.2	193.3	17.5	12.6	3.4
2012	30.0	30.7	29.7	11.4	190.7	17.4	12.6	3.4
2013	26.9	29.1	29.7	11.3	186.8	16.7	12.0	3.3
2014	21.6	26.6	30.7	11.2	173.2	14.9	10.9	3.0
2015	17.9	24.9	30.1	11.2	162.4	13.0	9.7	2.7
2016	14.1	23.7	29.9	11.0	150.2	11.4	8.6	2.4
2017	11.1	23.1	30.2	10.9	144.1	10.8	8.1	2.2
2018	8.7	22.5	30.5	10.8	138.2	10.2	7.6	2.0