Supplement of

Decadal Evolution of Aerosol-Mediated Ozone Responses in Eastern China Under Clean Air Actions and Carbon Neutrality Policies

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Table S1. Seasonal changes in five key meteorological parameters (shortwave radiation (SW), temperature (T_2), relative humidity (RH_2), planetary boundary layer height (PBLH), and wind speed (WS_{10})) during 2013-2020.

		SW (W m^{-2})	T_2 (K)	RH_2 (%)	PBLH (m)	WS_{10} (m s^{-1})
winter	Ph I	-9.4752	-0.5154	5.71323	-16.9564	0.057943
	Ph II	-7.2357	0.0669	5.51151	14.8245	0.398526
	Ph I+II	-16.7109	-0.4485	11.22474	-2.1319	0.456469
summer	Ph I	-8.2199	-0.6606	2.82714	-47.124	0.012916
	Ph II	62.1516	2.0566	-8.70154	106.6647	-0.36423
	Ph I+II	53.9317	1.396	-5.8744	59.5407	-0.35132

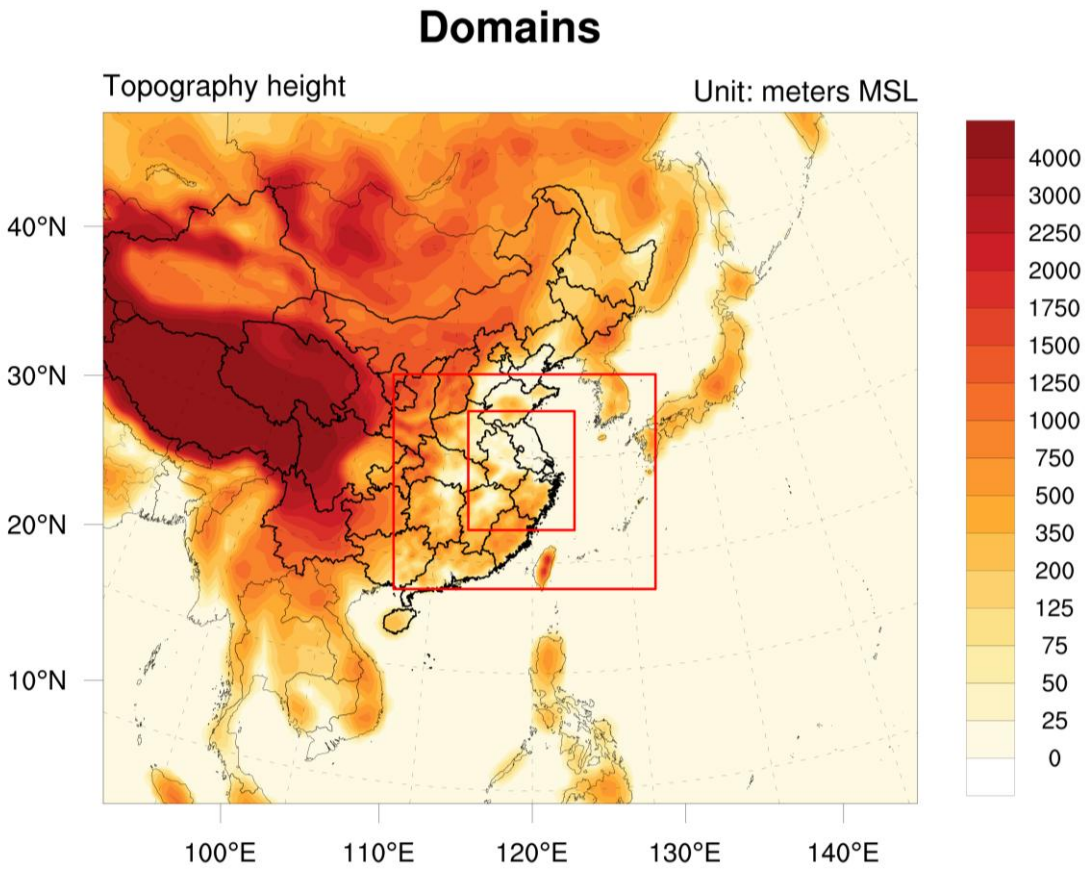

Figure S1. Chart of the three WRF-Chem simulation domains with topography.

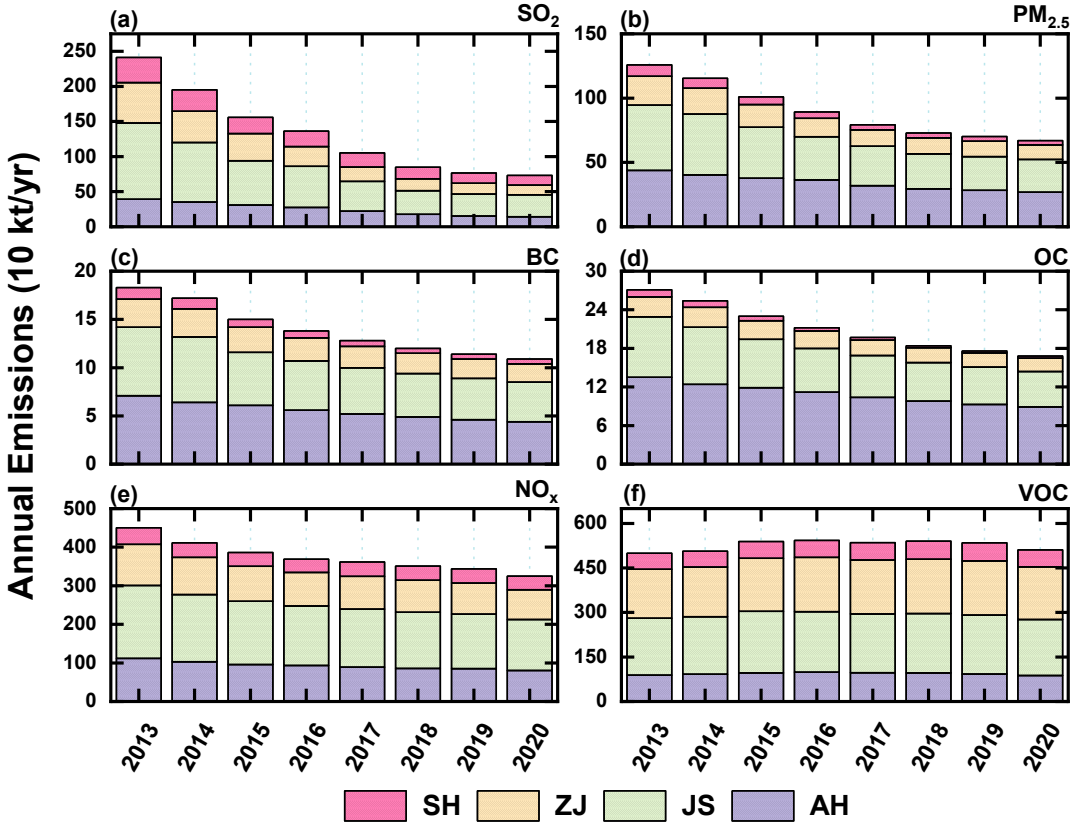

Figure S2. Trends in major anthropogenic emissions in YRD during 2013-2020.

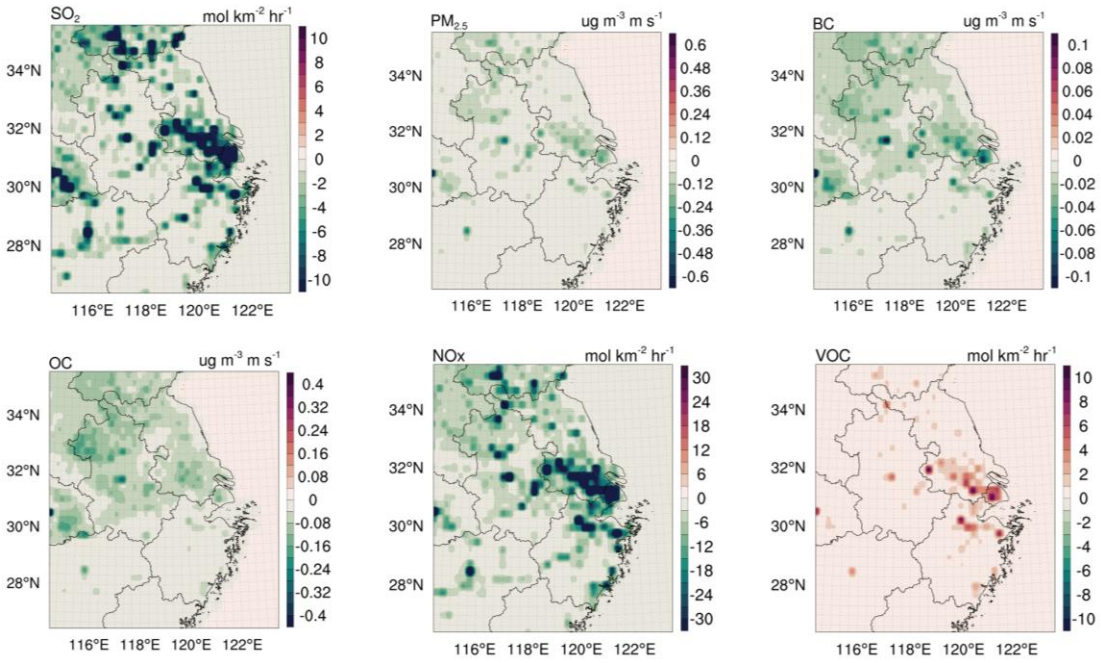

Figure S3. Distribution in major anthropogenic emissions changes in YRD during 2013-2020.

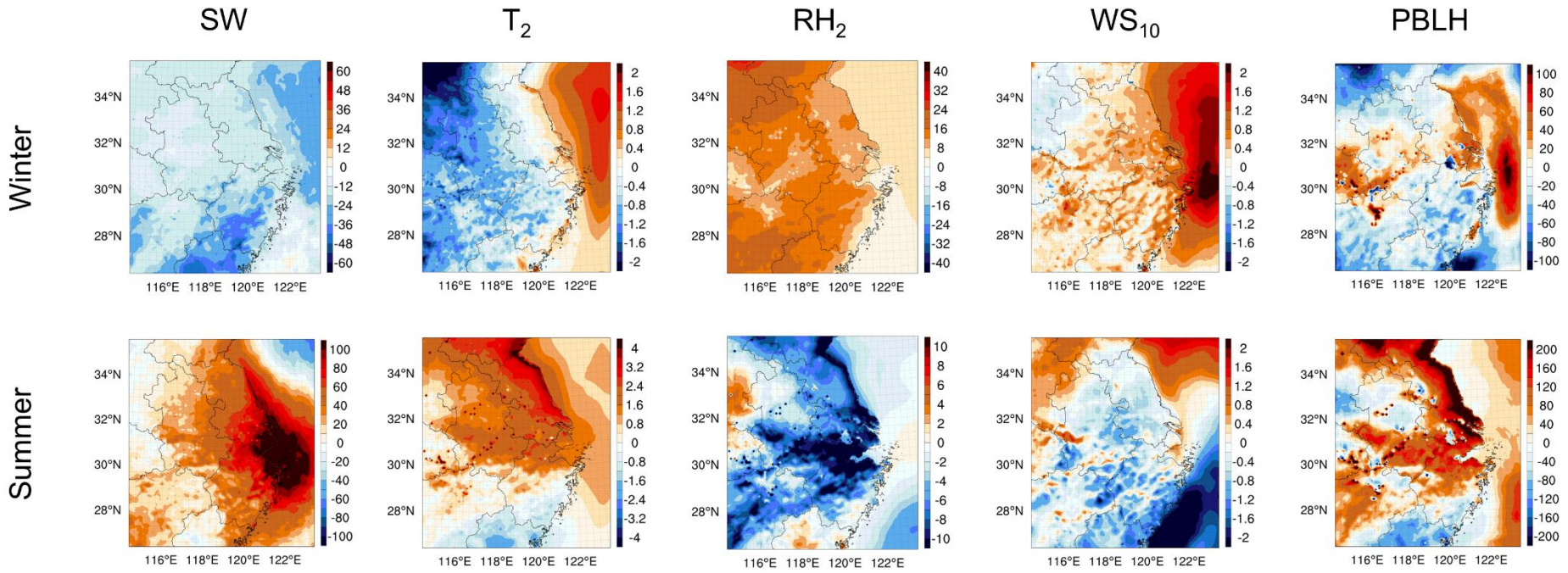

Figure S4. The responses of surface shortwave radiation (SW, units: W m^{-2}), T_2 (units: K), RH_2 (units: %), (PBLH, f, m, units: m), and WS_{10} (units: m s^{-1}) to variations in meteorological conditions during the summer and winter from 2013 to 2020.

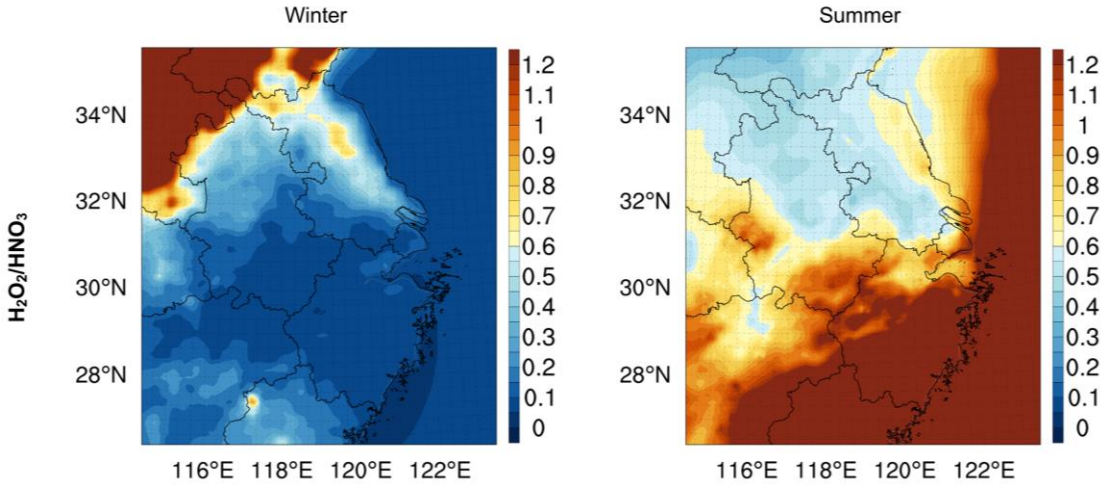

Figure S5. Spatial distribution of the H_2O_2/HNO_3 ratio over the Yangtze River Delta under baseline conditions (20E20M_AEs) in (a) winter and (b) summer. This ratio serves as an indicator of O_3 production sensitivity: values below 0.6 indicate VOC-limited regimes, values above 0.8 indicate NO_x-limited regimes, and values between 0.6 and 0.8 correspond to transitional regimes.

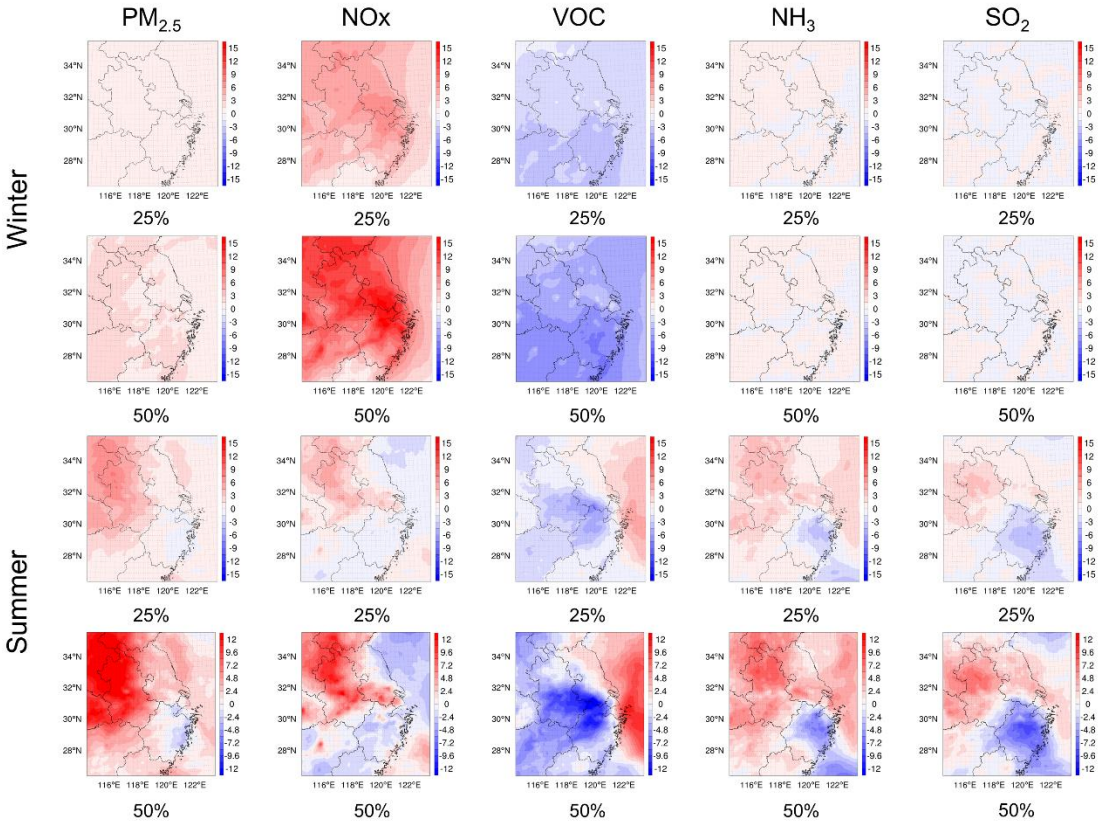

Figure S6. Spatial distribution of O_3 concentration changes (ppb) in response to (25) 50% emission reductions of primary $PM_{2.5}$, NOx, VOCs, NH_3, and SO_2 over the Yangtze River Delta during (top 2 rows) winter and (bottom 2 rows) summer, under the influence of aerosol effects (ARI+HET).

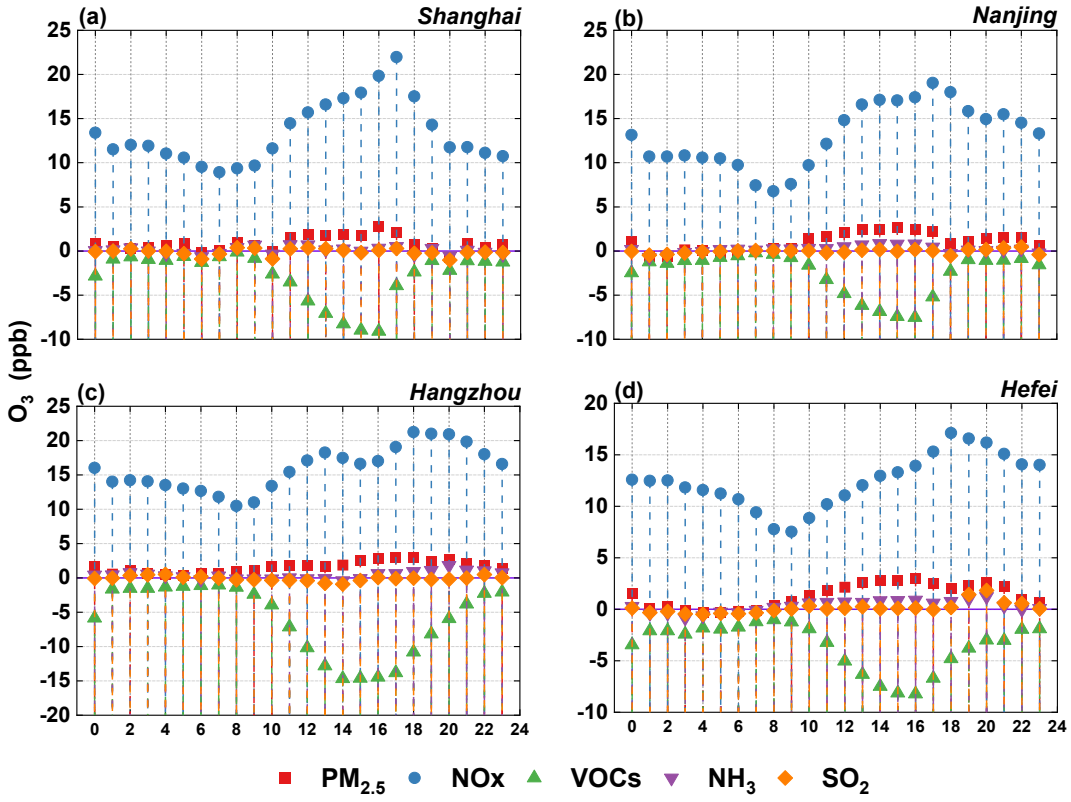

Figure S7. Diurnal variations in winter O_3 concentrations (units: ppb) in response to 50% reductions in primary $PM_{2.5}$, NOx,VOCs, NH_3, and SO_2 emissions over four typical cities in the Yangtze River Delta (Shanghai, Nanjing, Hangzhou, and Hefei) under aerosol effects (ARI+HET).

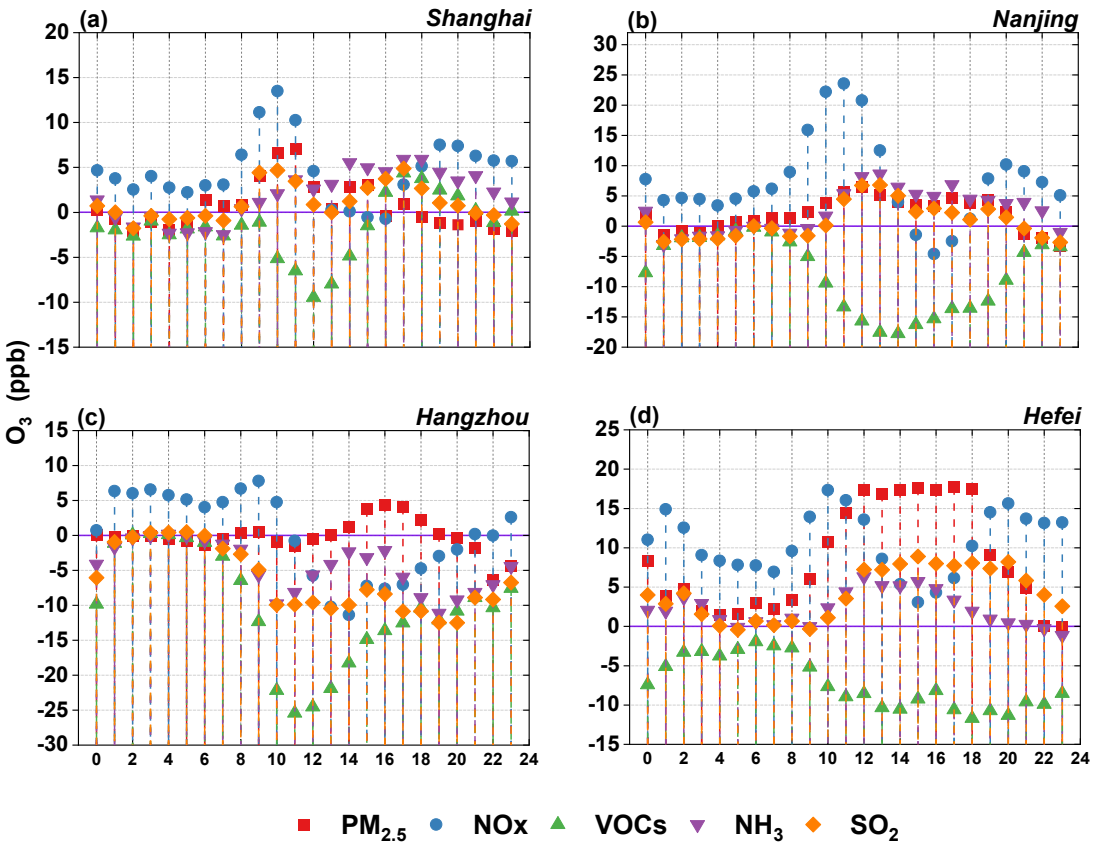

Figure S8. Diurnal variations in summer O_3 concentrations (units: ppb) in response to 50% reductions in primary $PM_{2.5}$, NOx, VOCs, NH_3, and SO_2 emissions over four typical cities in the Yangtze River Delta (Shanghai, Nanjing, Hangzhou, and Hefei) under aerosol effects (ARI+HET).

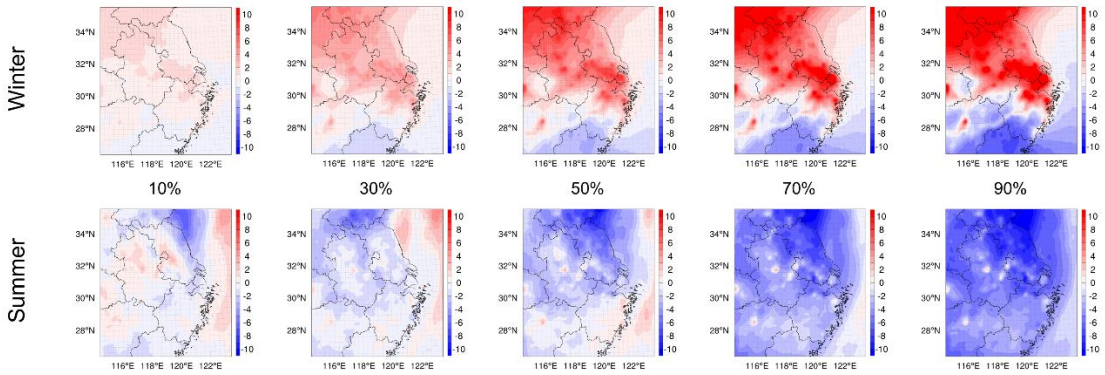

Figure S9. Spatial distribution of surface O_3 concentration changes (unit: ppb) under future carbon neutrality-driven emission reduction scenarios in winter (top) and summer (bottom) across the Yangtze River Delta.