SI for " Impacts of meteorology and emission reductions on haze pollution during the lockdown in the North China Plain: Insights from six-year simulations"

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Figure S1

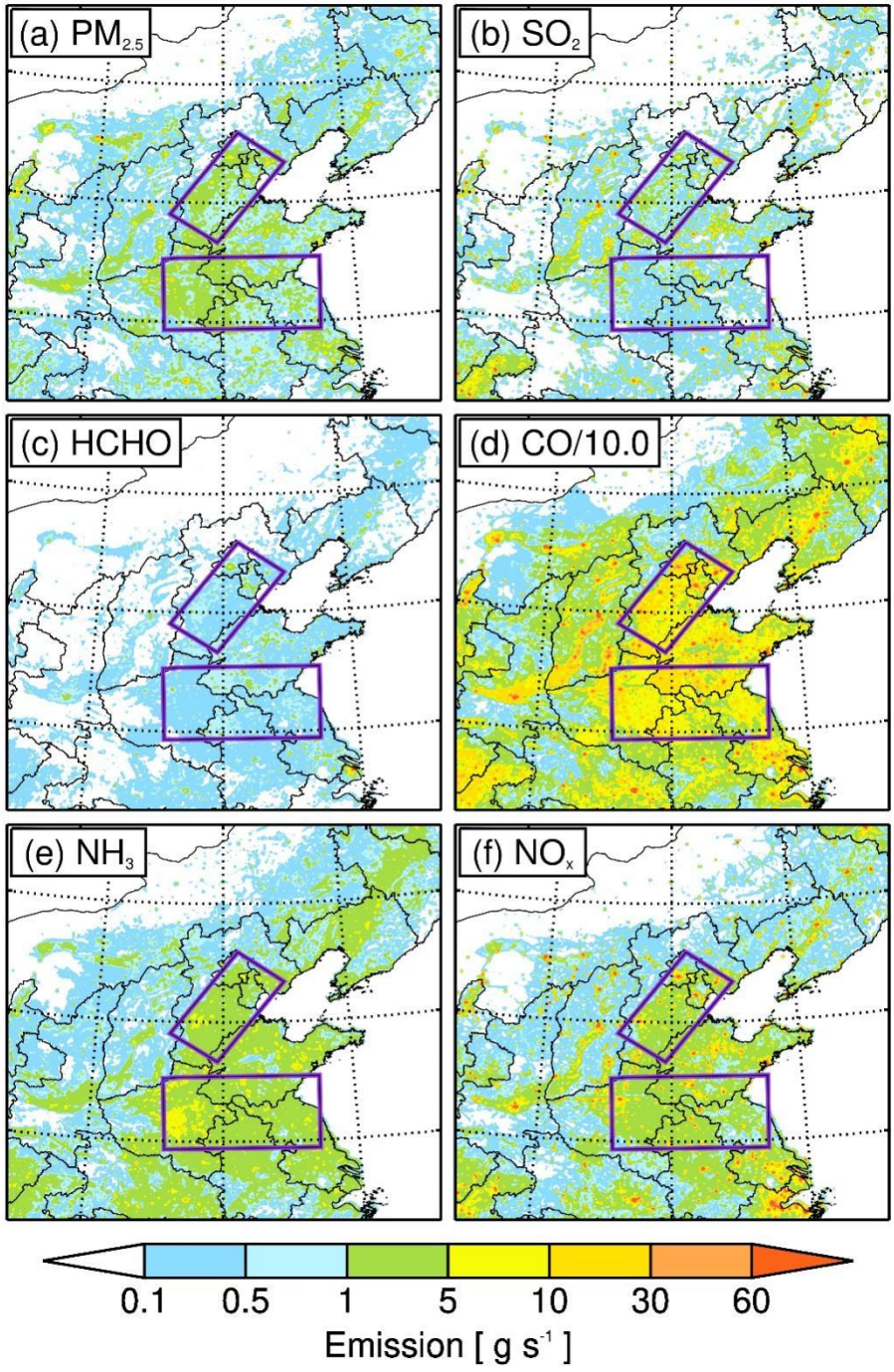

Figure S1 Spatial distributions of pollutants in the research domain during the COVID-19 lockdown. (a) $PM_{2.5}$, (b) SO_2, (c) HCHO, (d) CO, (e) NH_3, and (f) NO_x. SO_2, NO_x, NH_3 and HCHO (an effective indicator for VOCs) are gaseous precursors for secondary aerosols in $PM_{2.5}$. The regions of interest, NNCP (Northern North China Plain) and SNCP (Southern North China Plain), are highlighted.

Figure S2

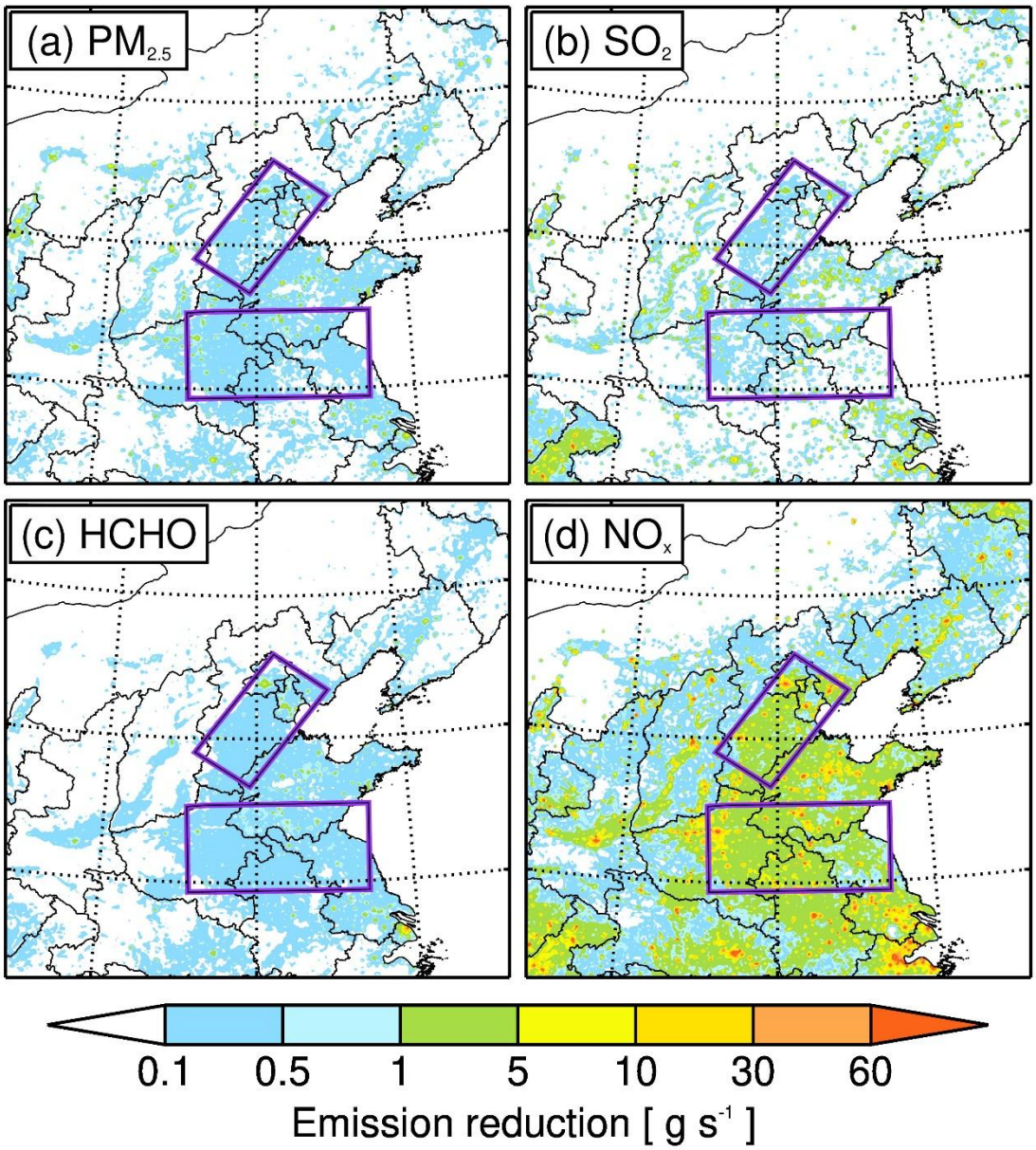

Figure S2 Spatial distributions of emission reduction in the research domain during the COVID-19 lockdown. (a) $PM_{2.5}$, (b) SO_2, (c) HCHO, and (d) NO_x. SO_2, NO_x, and HCHO (an effective indicator for VOCs) are gaseous precursors for secondary aerosols in $PM_{2.5}$. The regions of interest, NNCP (Northern North China Plain) and SNCP (Southern North China Plain), are highlighted.

Figure S3

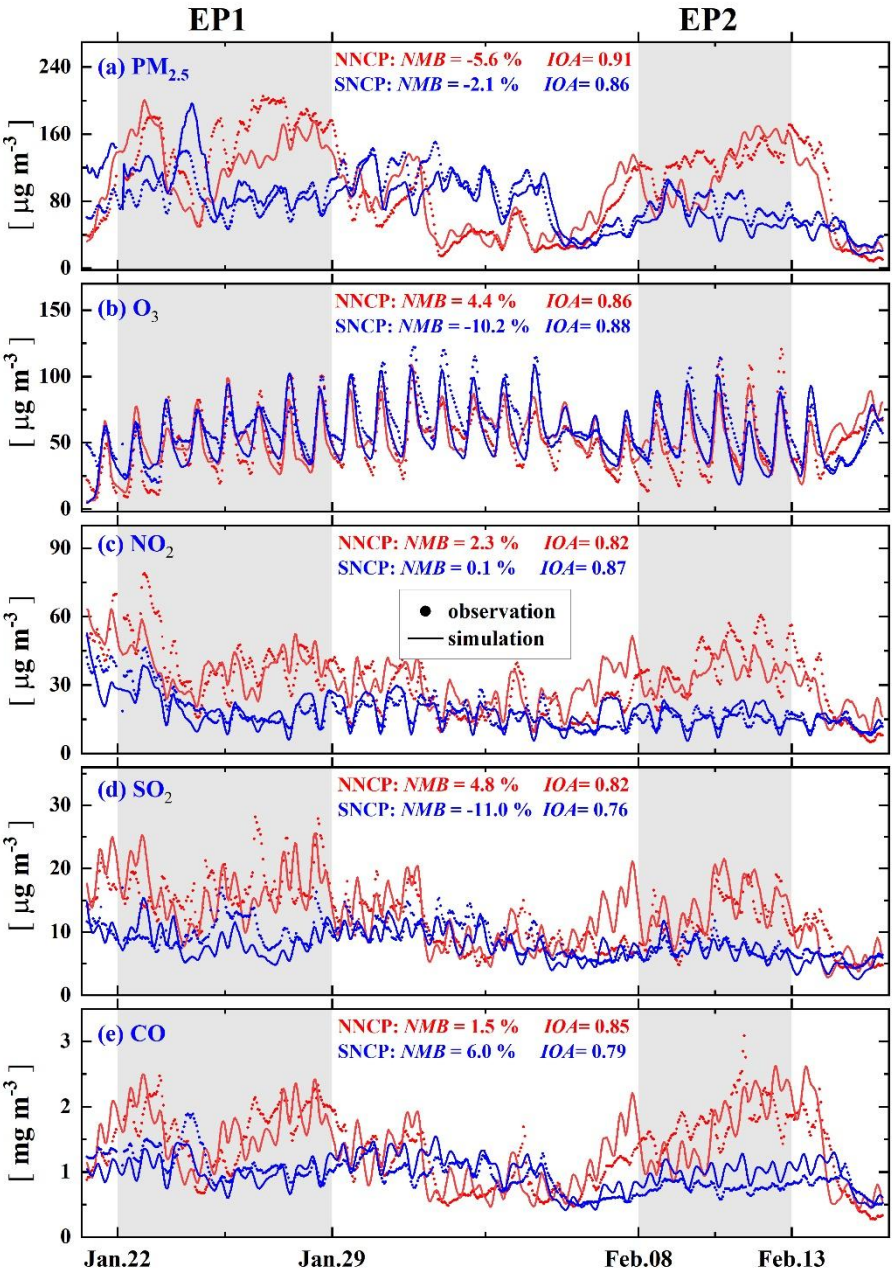

Figure S3. Comparisons of simulated and observed near-surface mass concentrations of (a) $PM_{2.5}$, (b) O_3, (c) NO_2, (d) SO_2, and (e) CO averaged across all ambient monitoring stations in the NNCP (red) and SNCP (blue) from 21 January to 16 February 2020. Solid lines represent simulated concentrations, while dots indicate observed concentrations.

Figure S4

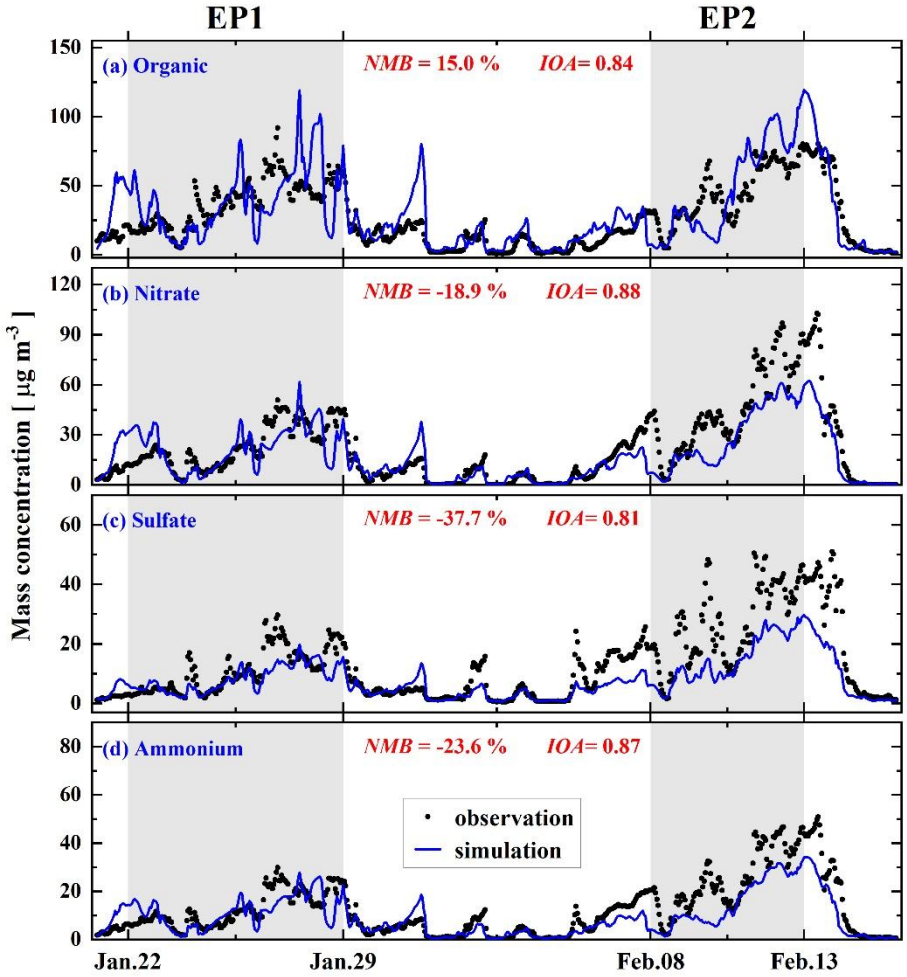

Figure S4. Comparisons of simulated and observed mass concentrations of (a) organic, (b) nitrate, (c) sulfate and (d) ammonium at the IAP monitoring site from 21 January to 16 February 2020. Blue lines represent simulated concentrations, while black dots indicate observed concentrations.

Figure S5

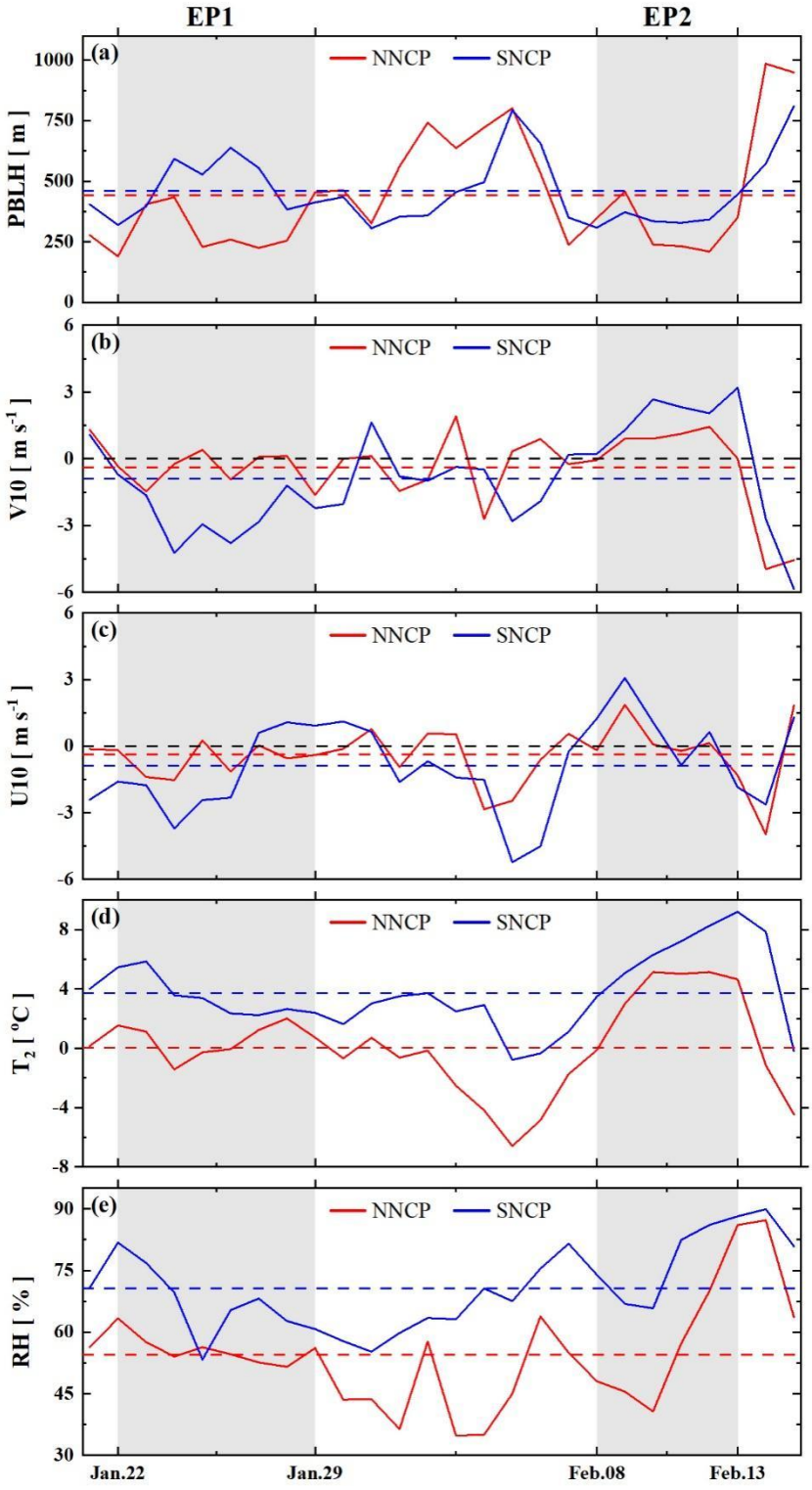

Figure S5. Regional day-to-day variations in (a) PBLH, (b) V10, (c) U10, (d) V10, and (e) RH in the NNCP and SNCP from 21 January to 16 February 2020.

Figure S6

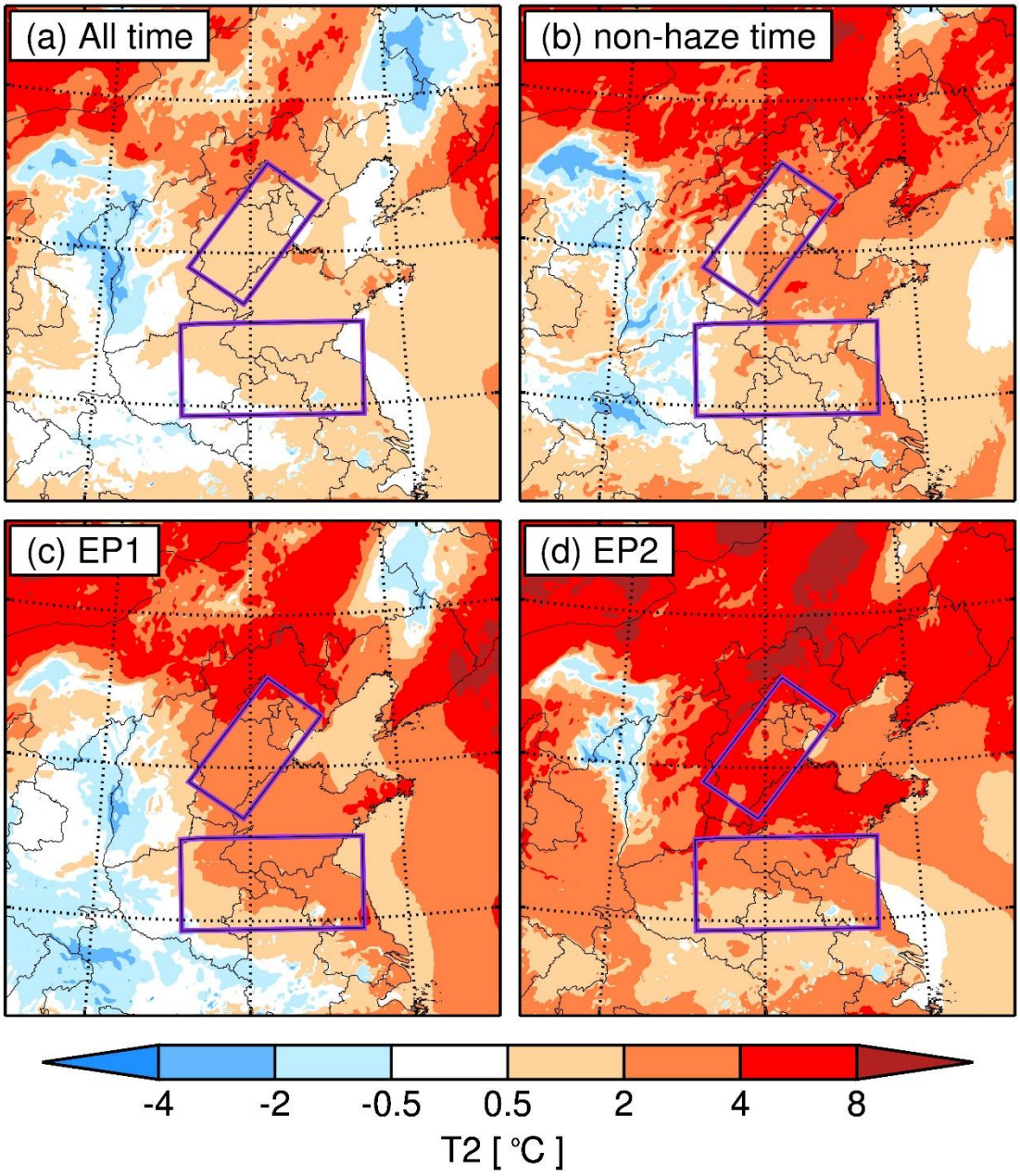

Figure S6. The pattern comparisons between the "BASE" and "SEN_METEO" simulations. The color gradient represents near-surface temperature (T2) changes averaged from (a) the entire study period, (b) the non-haze period, (c) the EP1 haze period, and (d) the EP2 haze period.

Figure S7

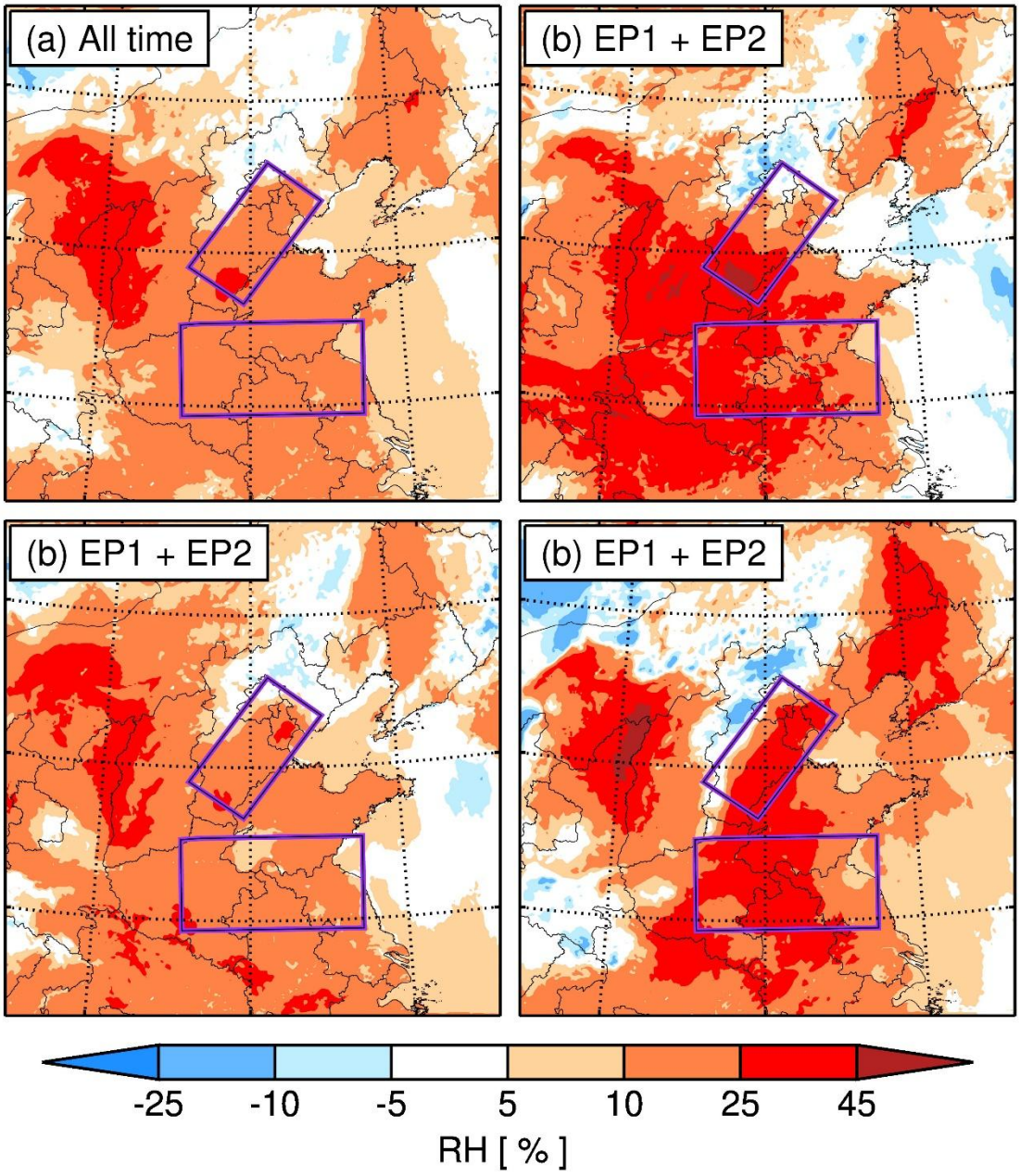

Figure S7. The pattern comparisons between the "BASE" and "SEN_METEO" simulations. The color gradient represents relative humidity (RH) changes averaged from (a) the entire study period, (b) the non-haze period, (c) the EP1 haze period, and (d) the EP2 haze period.

Figure S8

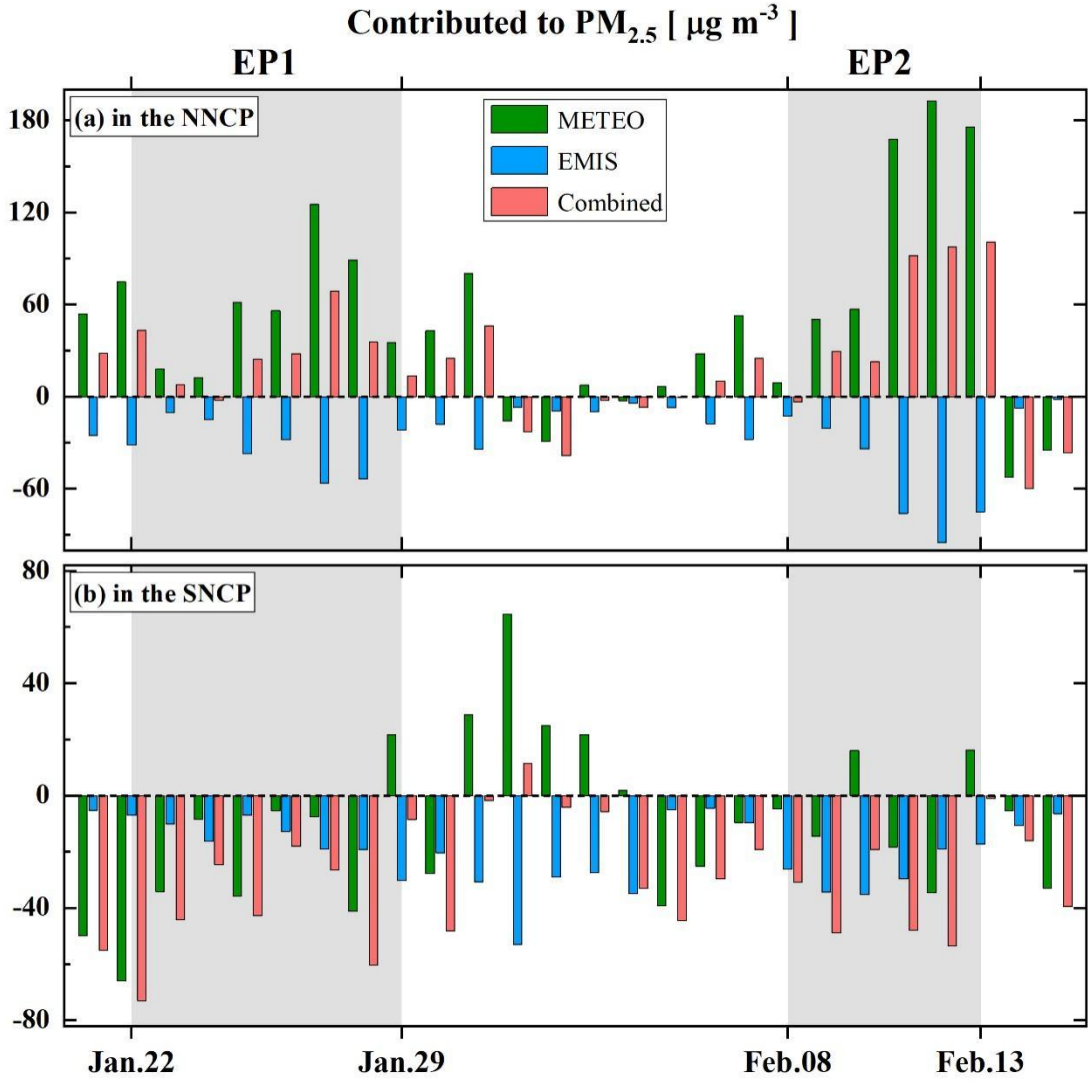

Figure S8. Regional contributions to daily $PM_{2.5}$ averaged in (a) the NNCP and (b) the SNCP. The contributions include meteorological conditions (METEO), abrupt decreases in anthropogenic emissions (EMIS), and combined effects of METEO and EMIS (Combined).

Table S1

Table S1 Scale factors we used in the Emission 2020.

Species / Province	CO	NO_x	SO_2	VOCs	$PM_{2.5}$	BC	OC
Beijing	22%	45%	26%	45%	18%	46%	8%
Tianjin	21%	38%	20%	41%	14%	22%	6%
Hebei	15%	45%	16%	36%	12%	17%	5%
Anhui	14%	56%	22%	31%	11%	22%	4%
Inner Mongolia	14%	29%	15%	34%	13%	16%	6%
Shaanxi	19%	45%	18%	34%	13%	22%	5%
Hubei	19%	55%	23%	35%	16%	23%	10%
Jilin	16%	39%	23%	34%	13%	18%	5%
Liaoning	21%	40%	28%	36%	16%	28%	8%
Henan	23%	57%	22%	41%	18%	35%	8%
Shandong	23%	50%	25%	39%	19%	35%	9%
Jiangsu	23%	50%	26%	41%	16%	35%	7%
Shanghai	35%	48%	42%	45%	34%	54%	42%