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Supplement of

The significant contribution of HONO to secondary pollutants during a severe winter pollution event in southern China

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Table S1. Performance statistics of meteorological variables for the innermost domain

| Variable | T2 ^c (°C) | H2 ^c (g/kg) | WS10 ^c (m s ⁻¹) | WD10 ^c (°) |
|--------------------------|----------------------|------------------------|--|-----------------------|
| Mean OBS ^{a, b} | 20.8 | 13.3 | 2.4 | 229.2 |
| Mean SIM ^b | 20.4 | 12.2 | 2.1 | 232.5 |
| MB ^b | -0.4 | -1.1 | -0.2 | 3.3 |
| NMB ^b (%) | -2.0 | -8.1 | -8.9 | 1.4 |
| NME ^b (%) | 5.1 | 11.2 | 41.7 | 24.6 |

^a The observation data was obtained from the National Climatic Data Center (NCDC) (<https://www7.ncdc.noaa.gov/CDO/cdo>).

^b Mean OBS: average observed values; Mean SIM: average simulated values; MB: bias; NMB: normalized mean bias; NME: normalized mean error.

^c T2: temperature at 2 meter; H2: specific humidity at 2 meter; WS10: wind speed at 10 meter; WD10: wind direction at 10 meter.

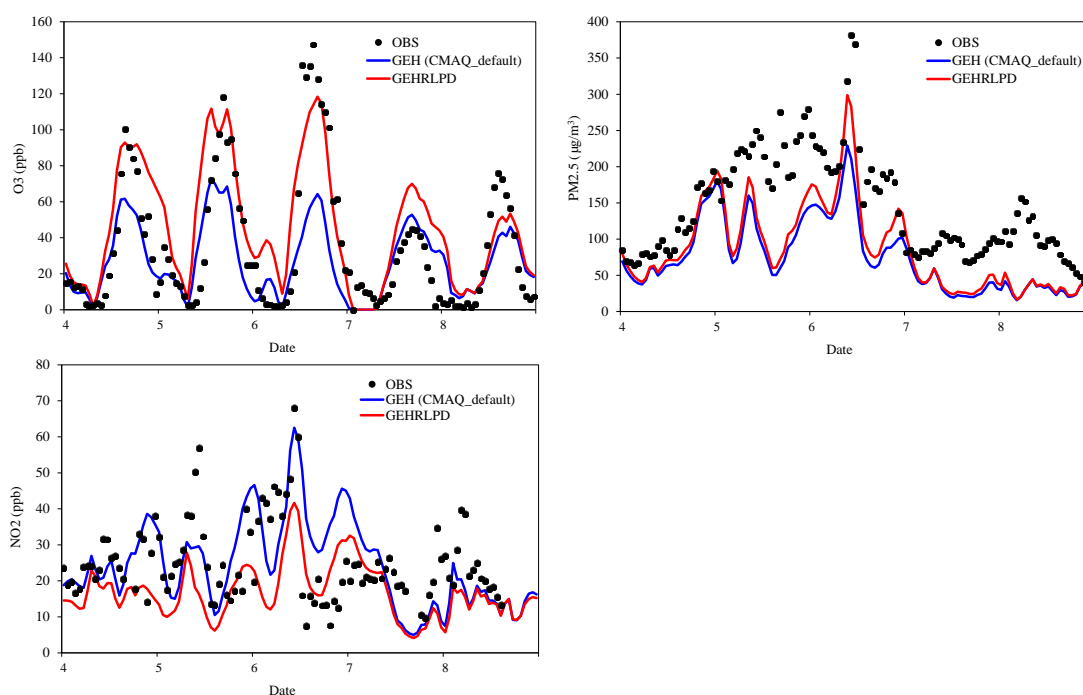


Fig. S1. Observed and simulated O₃, PM_{2.5} and NO₂ concentrations by the default and revised CMAQ model at Heshan site

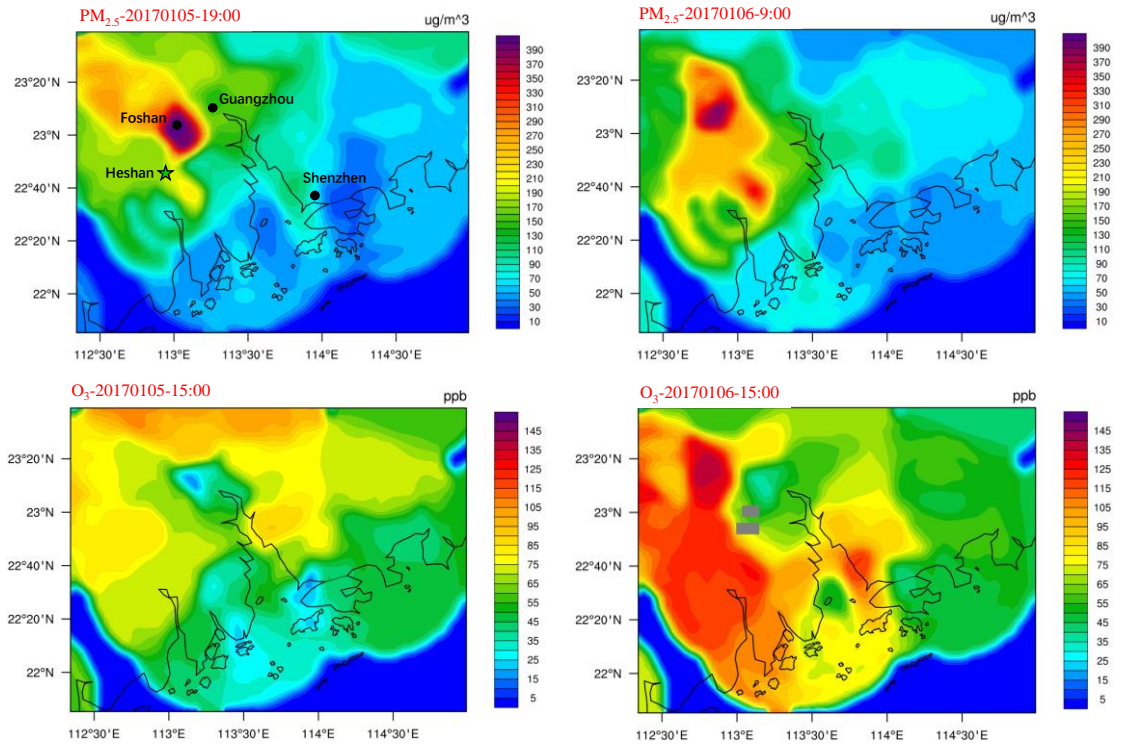


Fig. S2. Spatial distribution of observed PM_{2.5} (19:00 on 5 January and 9:00 on 6 January) and O₃ (15:00 on 5 and 6 January) concentrations

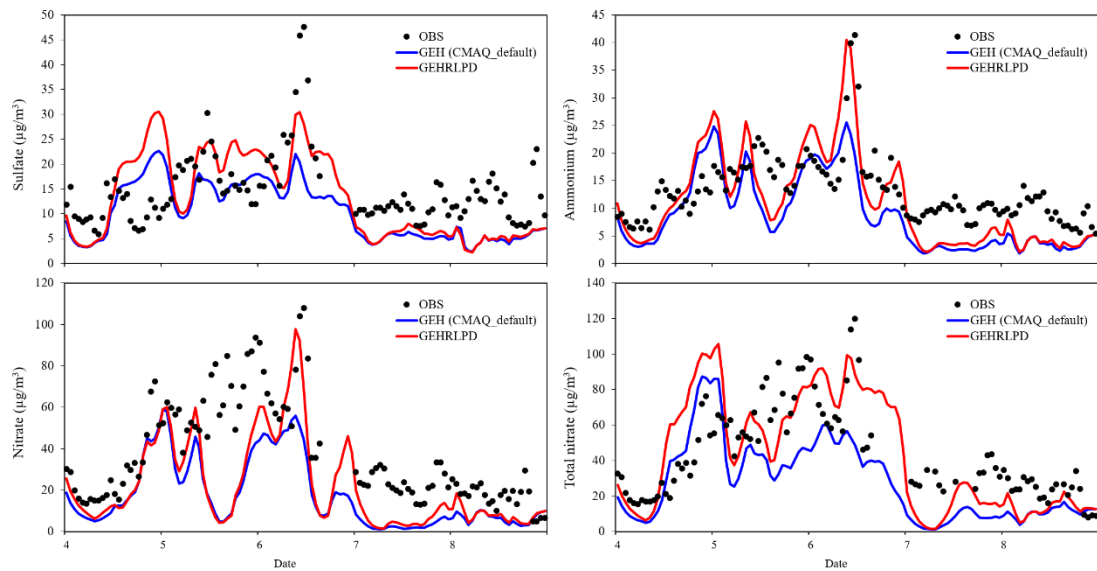


Fig. S3. Observed and simulated particle sulfate, ammonium, nitrate, and total nitrate concentrations by the default and revised CMAQ model at Heshan site

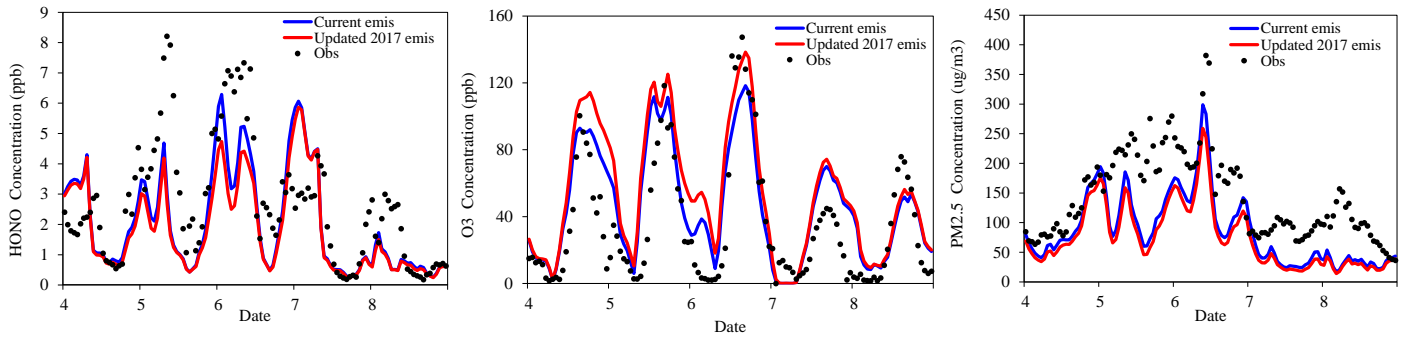


Fig. S4. Temporal variation of observed and simulated HONO, O₃, and PM_{2.5} concentrations with the current emissions and updated 2017 emissions. The updated 2017 emissions were obtained by linearly adjusting the current emissions based on the ratio of 2017 emission to 2010 emission for China reported in a very recent paper (Zheng et al., 2018)

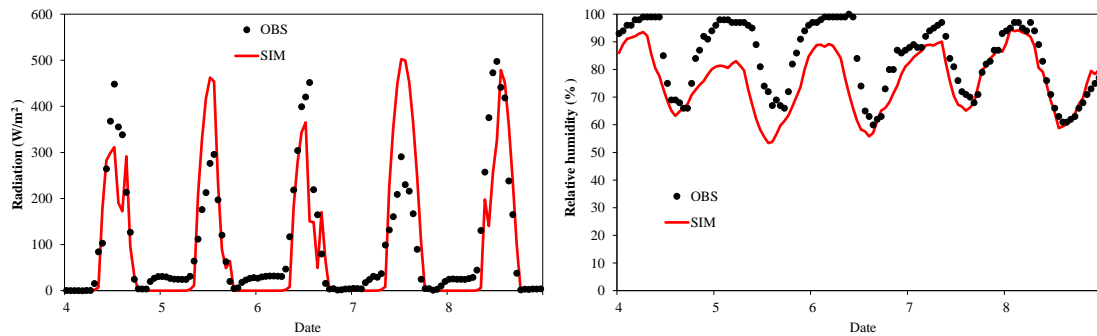


Fig. S5. Diurnal variations of observed and simulated radiation and relative humidity at Heshan site

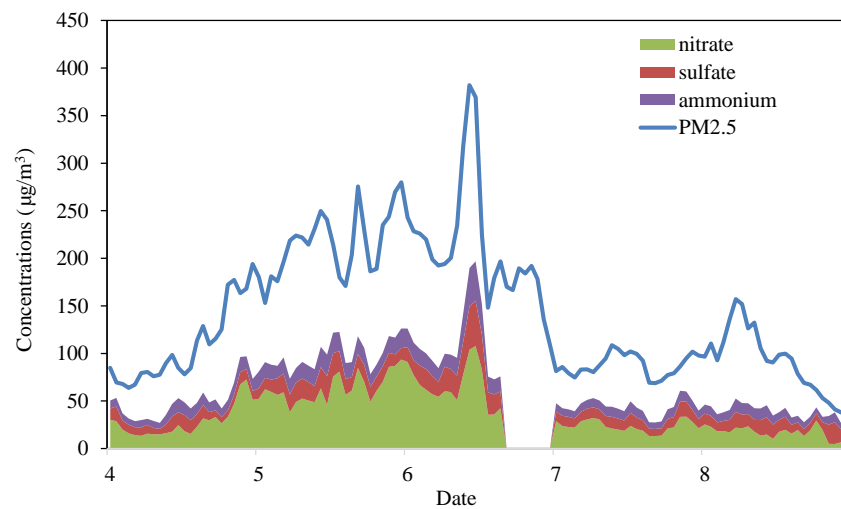


Fig. S6. Observed hourly variations of nitrate, sulfate, ammonium and PM_{2.5} concentrations during 4-8 January, 2017 at Heshan site.

References cited in this response:

Zheng, B., Tong, D., Li, M., Liu, F., Hong, C., Geng, G., Li, H., Li, X., Peng, L., Qi, J., Yan, L., Zhang, Y., Zhao, H., Zheng, Y., He, K., and Zhang, Q.: Trends in China's anthropogenic emissions since 2010 as the consequence of clean air actions, *Atmos. Chem. Phys.*, 18, 14095-14111, <https://doi.org/10.5194/acp-18-14095-2018>, 2018