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*Supplement of*

**Dissimilar Roles of Aerosols, Nitrogen Deposition and Ozone on the Terrestrial Carbon Sink in China during 2010-2020**

Nanhong Xie et al.

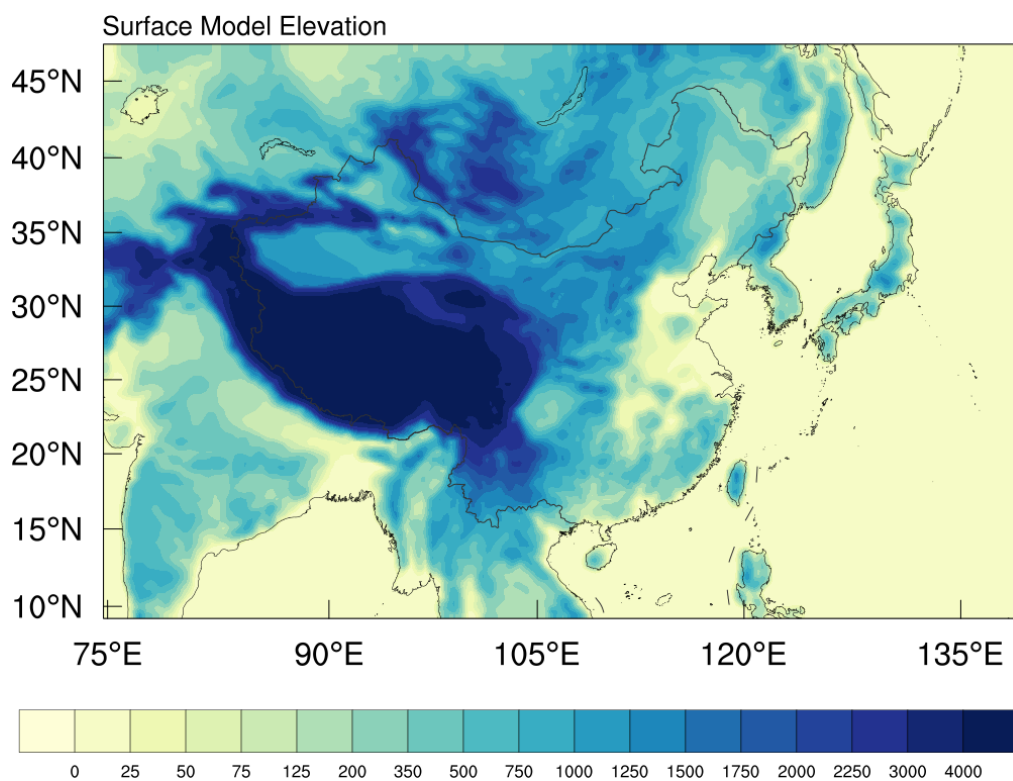
Corresponding to: Tijian Wang (tjwang@nju.edu.cn)

**Contents of this file**

Figures S1 to S9

Table S1

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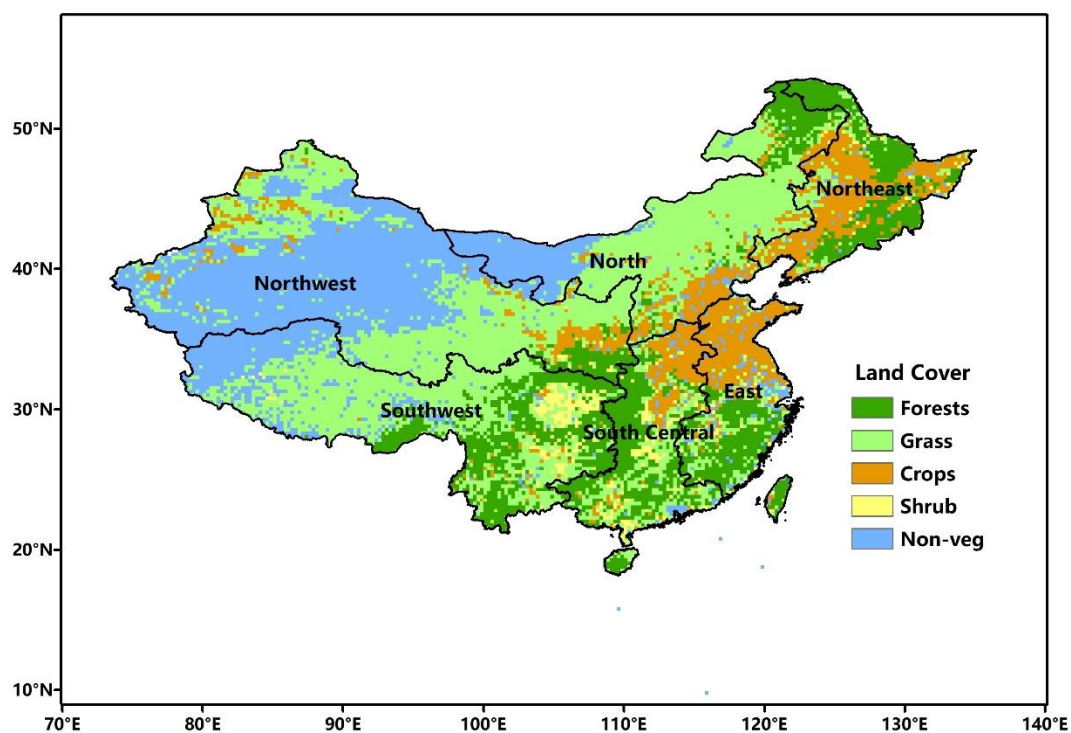


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**Figure S1.** The modeling domain applied and Topographic Elevation (Units: m) in this study.

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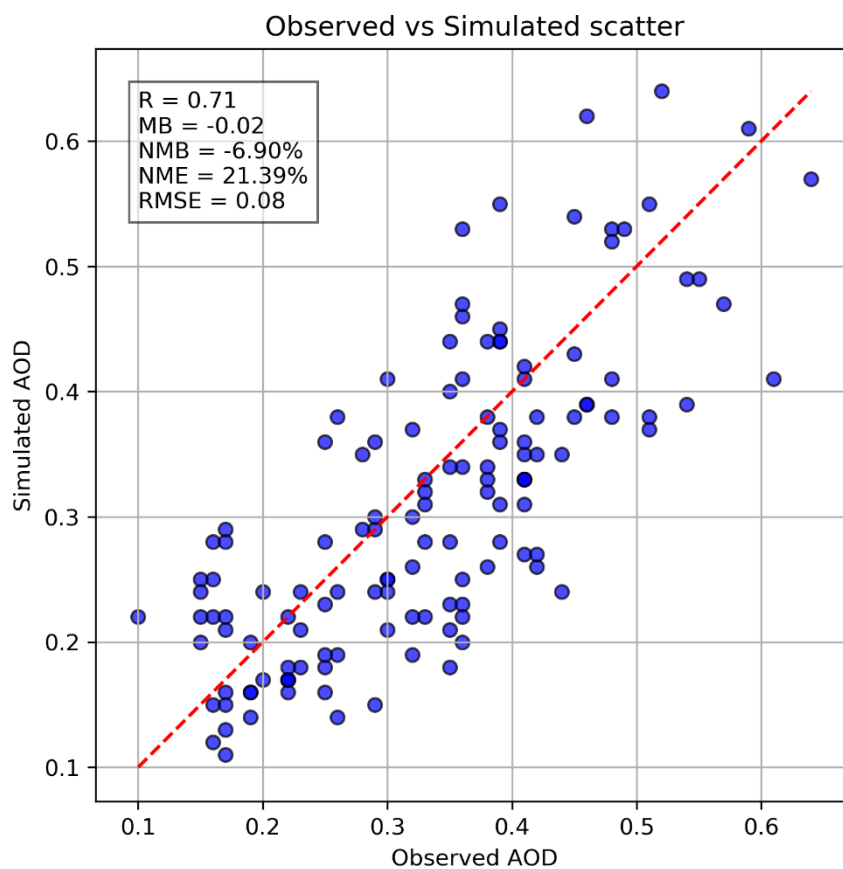


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81 **Figure S2.** Six regions of China. The background map shows ecosystem types further categorized  
82 based on 2017 MODIS land use types.

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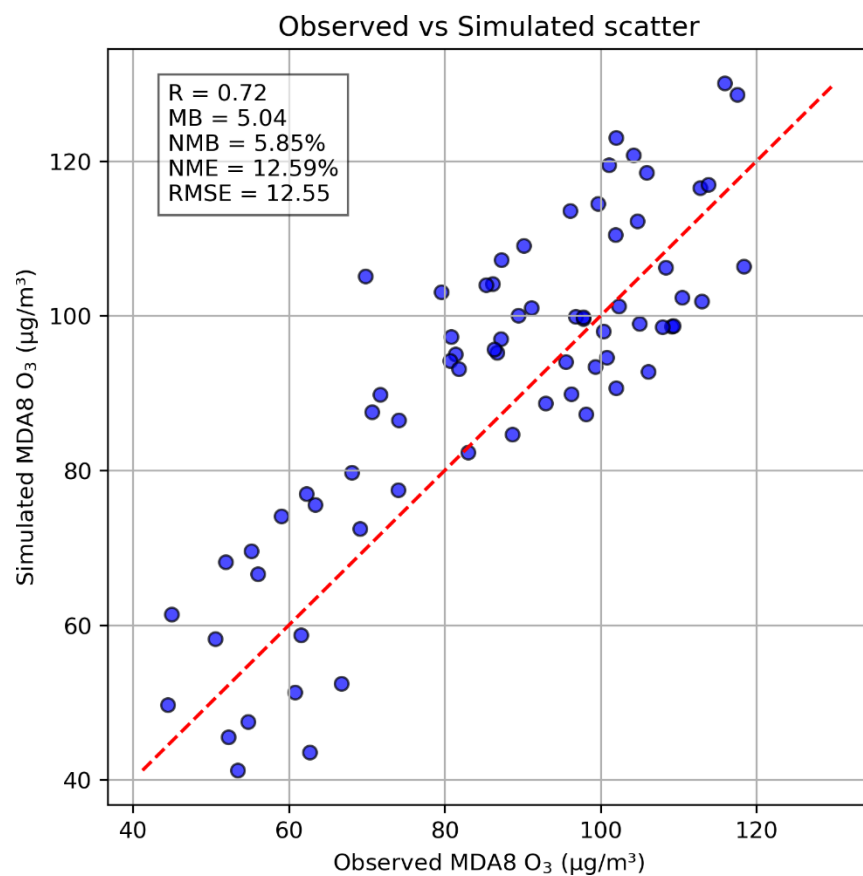
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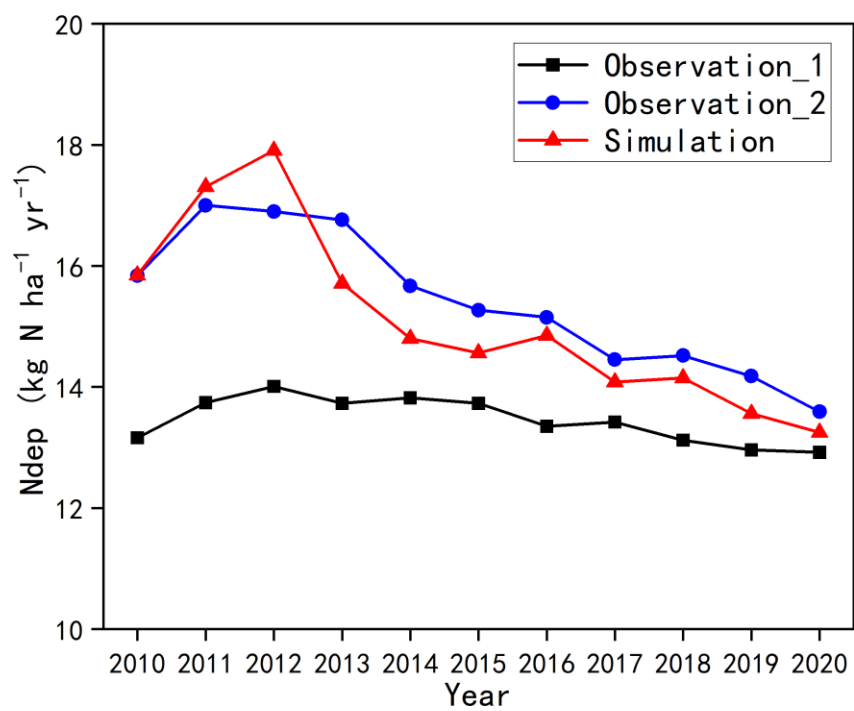
107 **Figure S3.** Monthly mean aerosol scatter plot between simulations and MODIS from 2010 to 2020.

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**Figure S4.** Scatter plot of MDA8 O<sub>3</sub> from simulations and observations from 2015 to 2020.

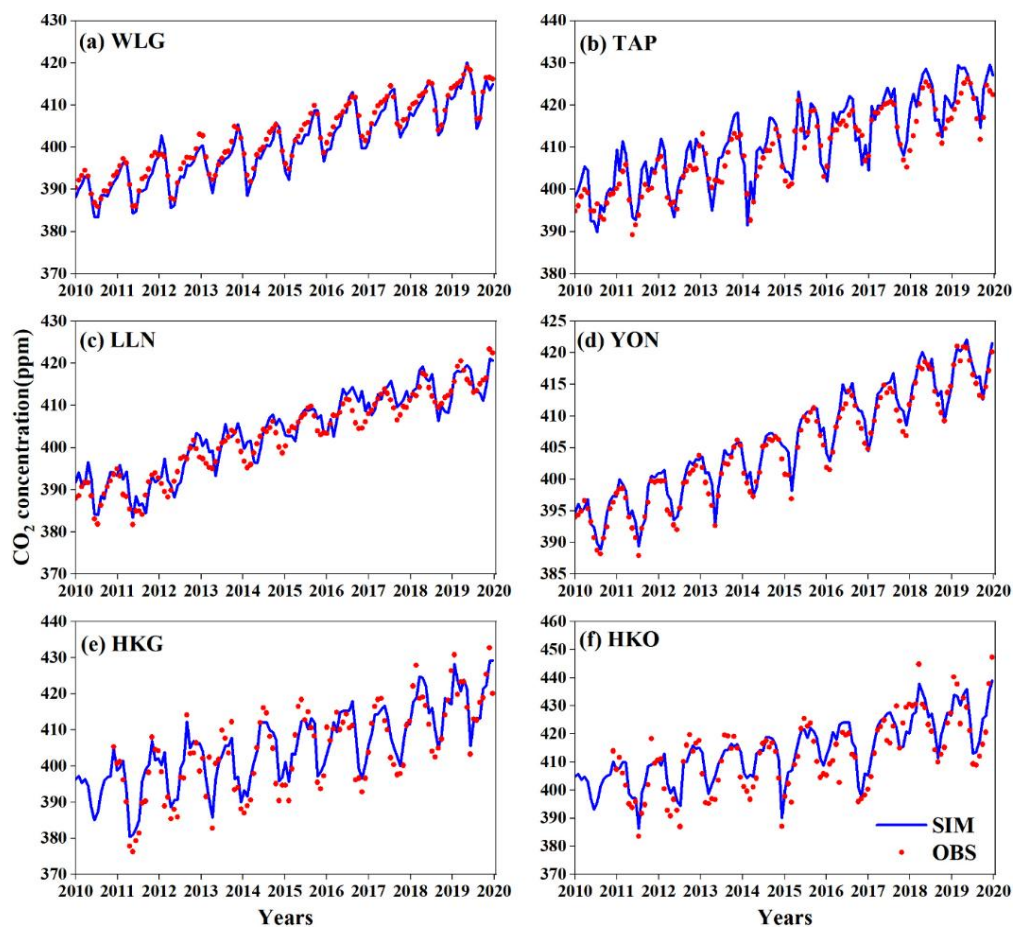
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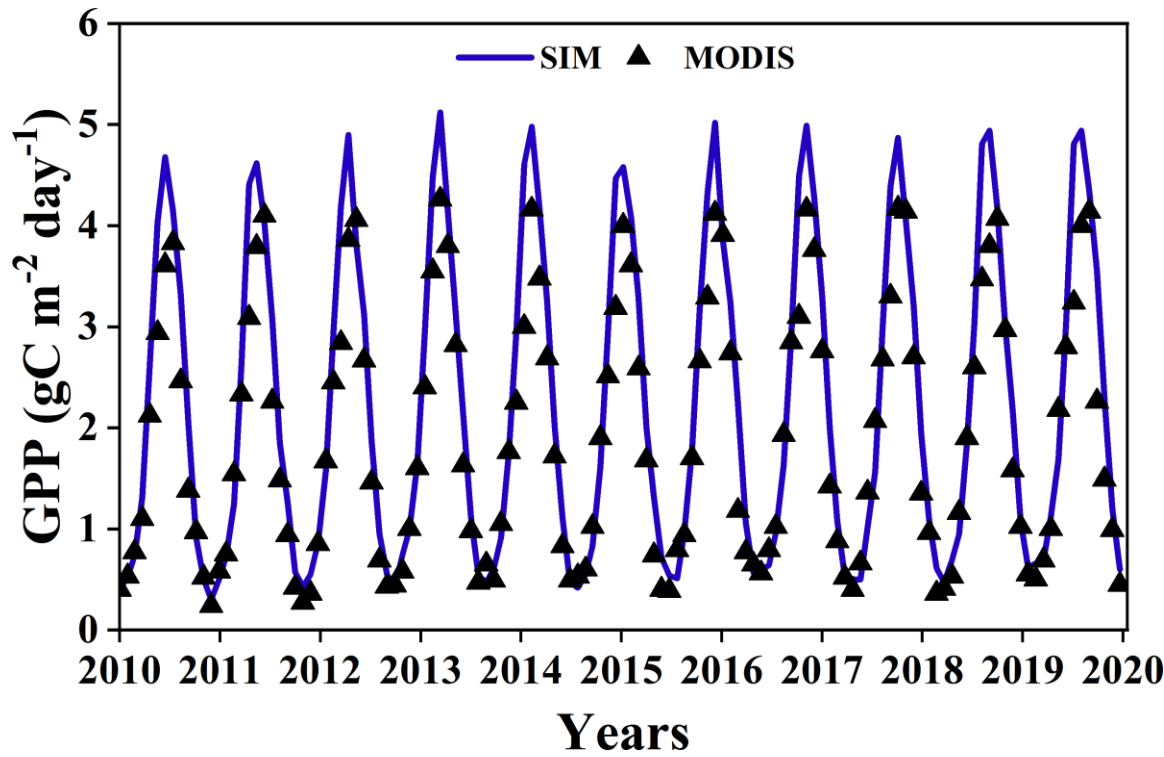
155 **Figure S5.** Comparison of annual mean atmospheric nitrogen deposition from simulations and  
156 literature reports during 2010–2020.

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**Figure S6.** Monthly mean CO<sub>2</sub> concentration data at six monitoring sites in East Asia, with simulated values (blue line) and observed values (red dots). Units: ppm.

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196 **Figure S7.** Comparison of the monthly mean GPP values simulated for the period 2010–2020 (blue  
197 line) with MODIS data (black triangles).Units: gC m<sup>-2</sup> day<sup>-1</sup>

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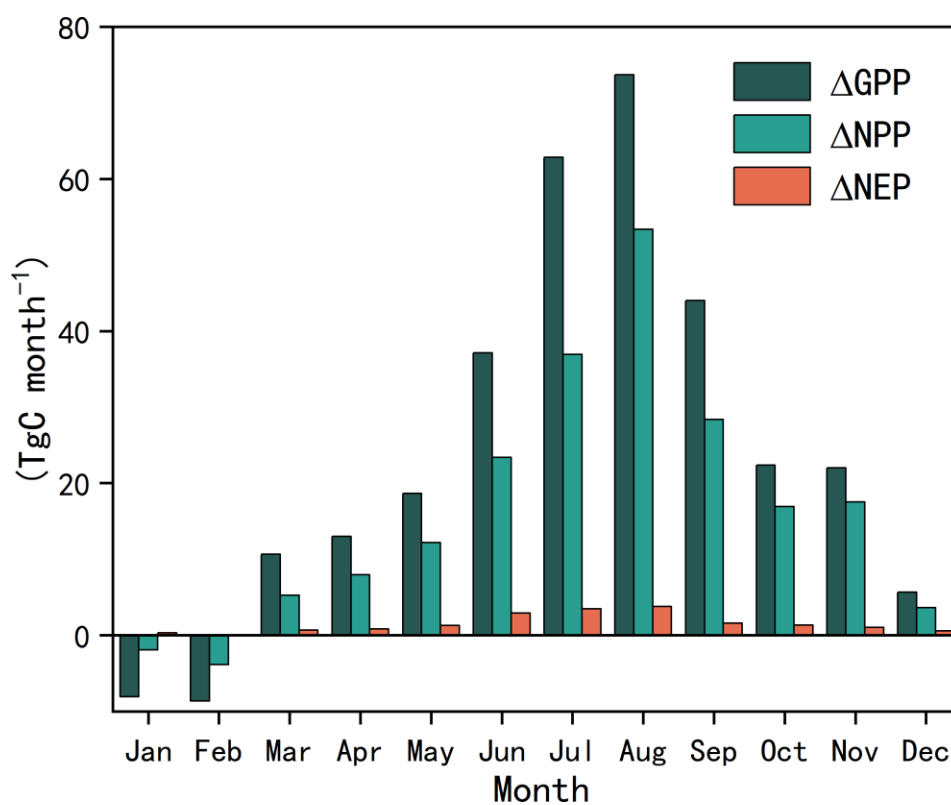
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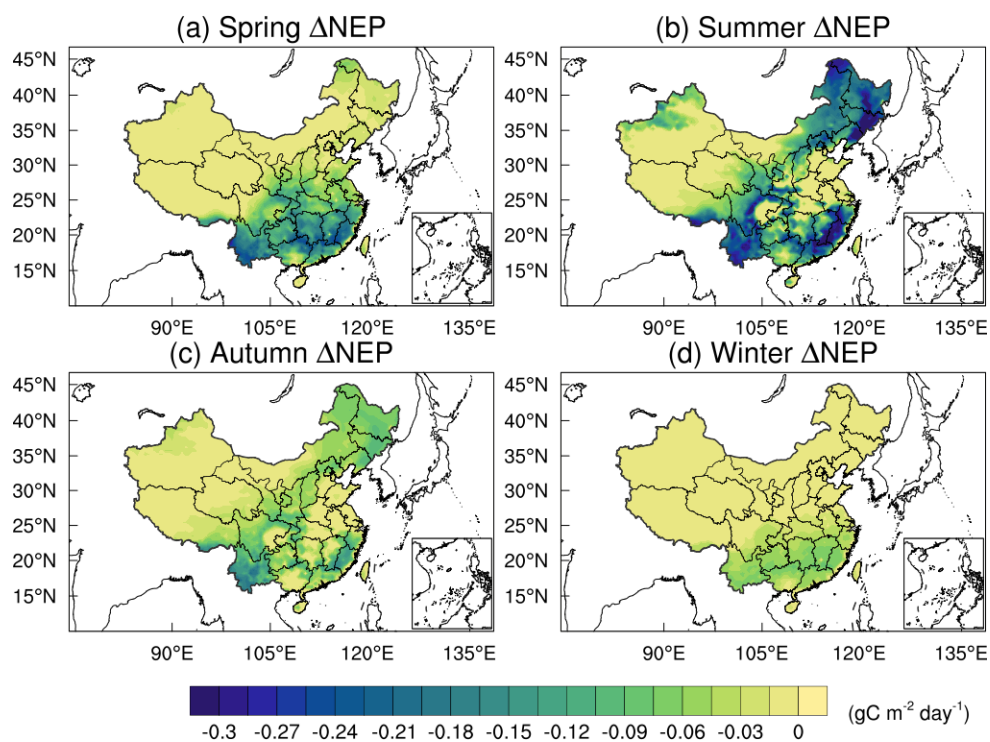
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226 **Figure S8.** Monthly variations in GPP, NPP, and NEP induced by aerosol direct radiative effects  
227 during 2010–2020.

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**Figure S9.** O<sub>3</sub>-induced seasonal variation in NEP.

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270 **Table S1.** Information about the CO<sub>2</sub> observation site and comparison between simulation and  
 271 observation.

| Sites | Time          | (Latitude,<br>Longitude) | Elevation<br>(m) | Obs<br>(ppm) | Sim<br>(ppm) | MB<br>(ppm) | RMSE<br>(ppm) | R    |
|-------|---------------|--------------------------|------------------|--------------|--------------|-------------|---------------|------|
| WLG   | 2010-<br>2020 | (36.29,<br>100.90)       | 3810             | 403.3        | 401.5        | -1.8        | 2.98          | 0.92 |
| TAP   | 2010-<br>2020 | (36.73,<br>126.13)       | 20               | 410.3        | 412.9        | 2.6         | 4.6           | 0.89 |
| LLN   | 2010-<br>2020 | (23.46,<br>120.87)       | 2867             | 403.5        | 406.3        | 2.8         | 4.01          | 0.88 |
| YON   | 2010-<br>2020 | (24.47,<br>123.01)       | 30               | 405.9        | 404.8        | -1.1        | 1.75          | 0.96 |
| HKG   | 2011-<br>2020 | (22.21,<br>114.25)       | 60               | 404.7        | 407.8        | 3.1         | 6.02          | 0.84 |
| HKO   | 2011-<br>2020 | (22.31,<br>114.17)       | 65               | 412.3        | 415.6        | 3.3         | 6.17          | 0.83 |

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