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Supplement of

Simulation of ozone–vegetation coupling and feedback in China using multiple ozone damage schemes

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Figure S1

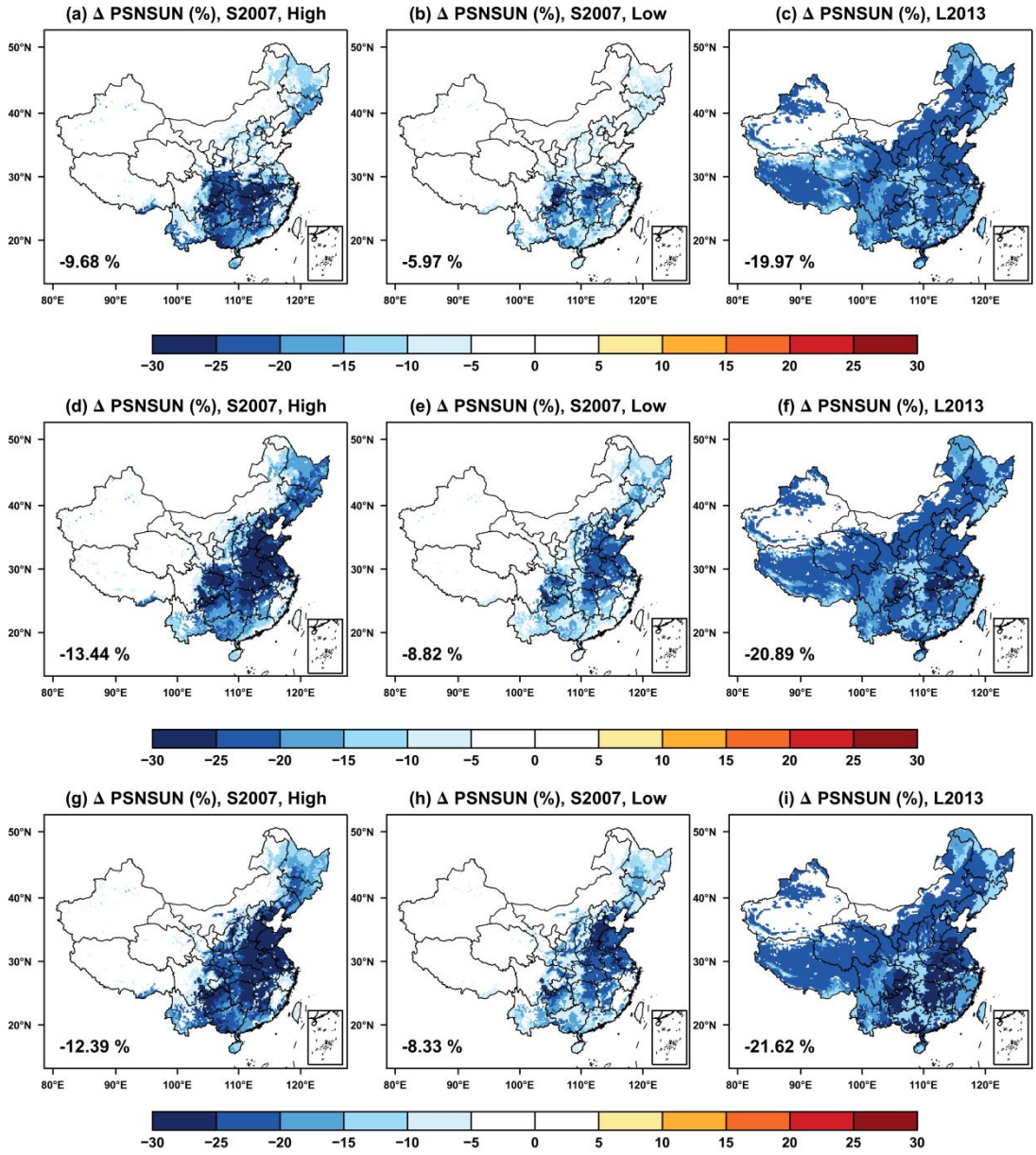


Figure S1 Offline O_3 damage (%) to the summertime photosynthesis of sunlit leaves in (a-c) June, (d-f) July, and (g-i) August for different O_3 damage schemes and sensitivities. The area-weighted percentage changes are shown in the lower left corner.

Figure S2

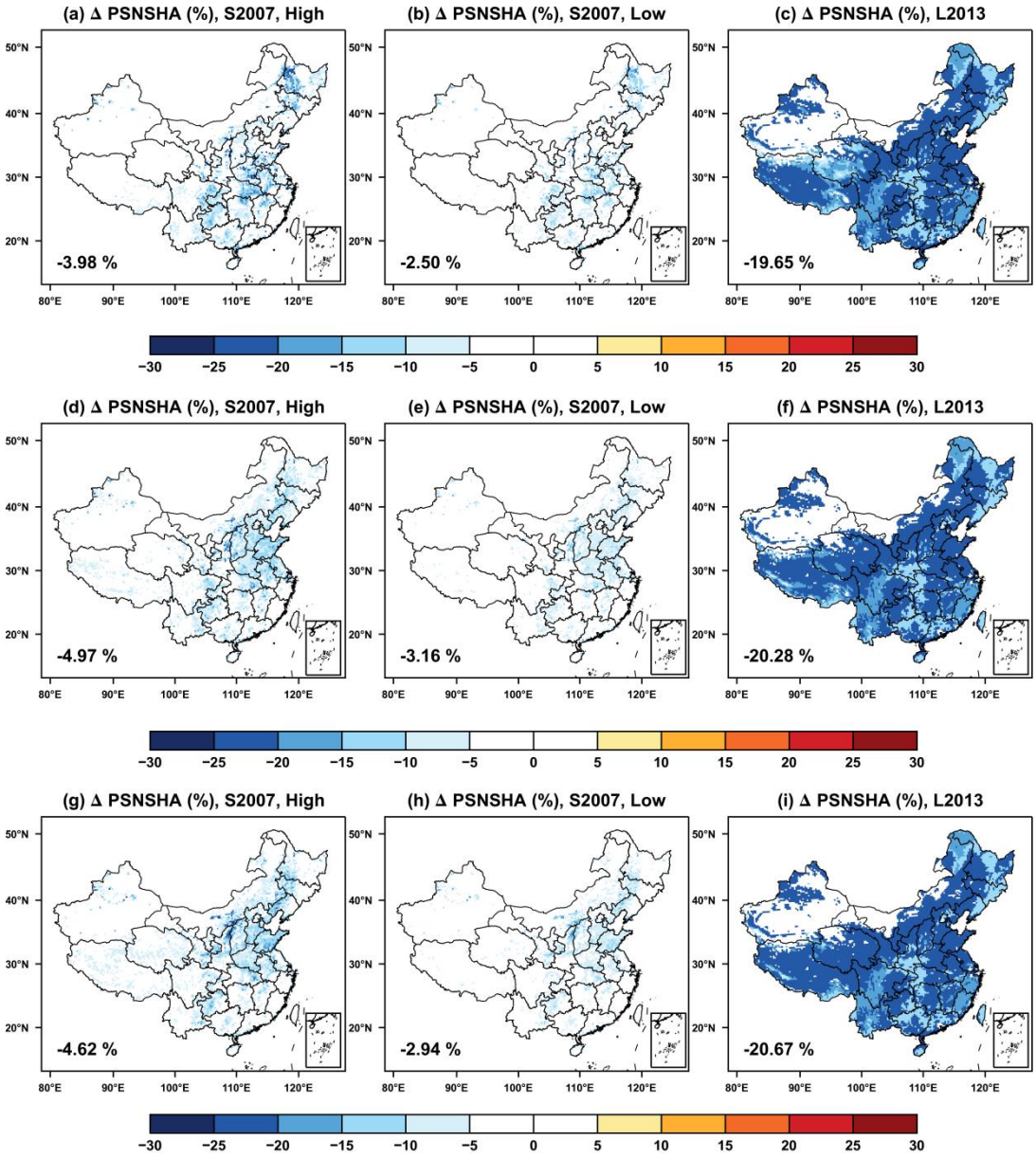


Figure S2 The same as Fig. S1 but for the changes in photosynthesis of shaded leaves.

Figure S3

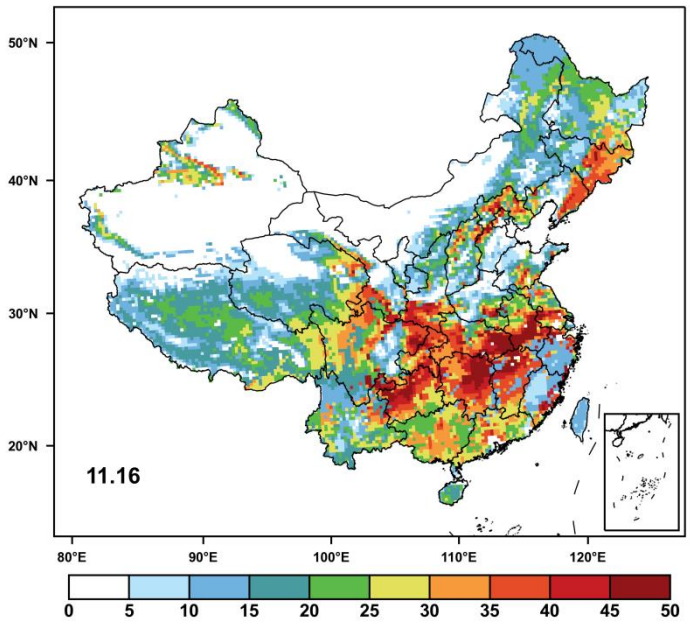
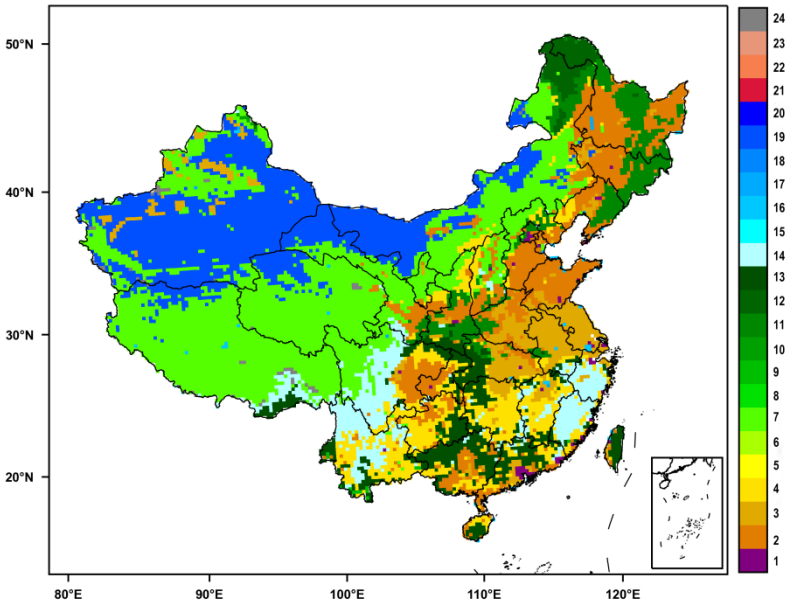


Figure S3 Distribution of CUO (Units: mmol m^{-2}) in China averaged for June-August. The area-weighted amount is shown in the lower left corner.

Figure S4



1 Urban and Built-Up
2 Dryland Cropland&Pasture
3 Irrigated Cropland&Pasture
4 Mixed Cropland and Pasture
5 Cropland/Grassland Mosaic
6 Cropland/Woodland Mosaic
7 Grassland
8 Shrubland
9 Mixed Shrubland/Grassland
10 Savanna
11 Deciduous Broadleaf
12 Deciduous Needleleaf
13 Evergreen Broadleaf
14 Evergreen Needleleaf
15 Mixed Forest
16 Water Bodies
17 Herbaceous Wetland
18 Wooded Wetland
19 Barren/Sparsely Vegetated
20 Herbaceous Tundra
21 Wooded Tundra
22 Mixed Tundra
23 Bare Ground Tundra
24 Snow or Ice

Figure S4 Distributions of plant functional types (PFTs) in China.

Figure S5

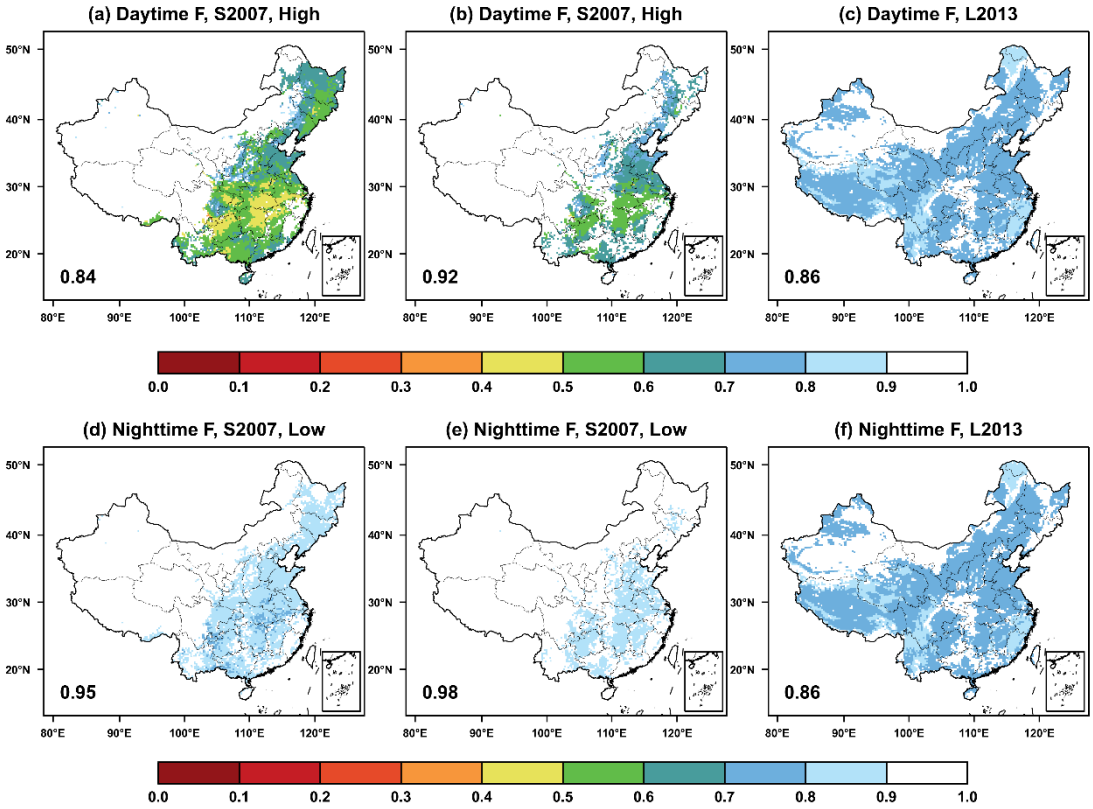


Figure S5 The undamaged fraction by O_3 (*F*) predicted with the S2007 scheme using (a, d) high and (b, e) low sensitivities or the (c, f) L2013 scheme. The area-weighted percentage changes are shown in the lower left corner.

Text S1

In NOAH-MP, stomatal resistance is calculated separately for sunlit and shaded leaves. Therefore, the undamaged fraction $F_{(sunlit/shaded)}$ in S2007 is dependent on the sensitivity parameter a_{PFT} and excessive area-based stomatal O_3 flux, which is calculated as the difference between $f_{O3(sunlit/shaded)}$ and threshold y_{PFT}:

$$F = 1 - a_{PFT} \times max\{f_{O_{3(sunlit/shaded)}} - y_{PFT}, 0\} \quad (1)$$

The stomatal O_3 flux $f_{O_3(sunlit/shaded)}$ is calculated as:

$$f_{O_{3(sunlit/shaded)}} = \frac{[O_3]}{r_a + k_{O_3} \cdot r_{s(sunlit/shaded)}} \quad (2)$$

where $r_{s(sunlit/shaded)}$ represents stomatal resistance (s m^{-1}) for sunlit/shaded leaves.

For the L2013 scheme, the leaf-level CUO for sunlit and sunshade (mmol m^{-2}) over the growing season is calculated as follows:

$$CUO_{(sunlit/shaded)} = \sum\left(\frac{[O_3]}{r_a + k_{O_3} \cdot r_{s(sunlit/shaded)}}\right) \quad (3)$$

$$F_{PO3(sunlit/shaded)} = a_p \times CUO_{(sunlit/shaded)} + b_p \quad (4)$$

$$F_{cO3(sunlit/shaded)} = a_c \times CUO_{(sunlit/shaded)} + b_c \quad (5)$$

where $F_{pO3(sunlit/shaded)}$ and $F_{cO3(sunlit/shaded)}$ are the damage ratios of photosynthesis and stomatal conductance for sunlit/shaded leaves, respectively.