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Ozone–vegetation feedback through dry deposition and isoprene emissions in a global chemistry–carbon–climate model

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Table S1 Biophysical parameters for different plant functional types (PFTs) used in YIBs model.

PFTs	m	b ($mmol\ m^{-2}\ s^{-1}$)	a_high ($mmol^{-1}\ m^{-2}$)	a_low ($mmol^{-1}\ m^{-2}$)	$F_{O3,crit}$ ($nmol\ m^{-2}\ s^{-1}$)
TDA	9.0	2	0.1	0.03	1.6
GRAC3	11.0	8	1.4	0.25	5.0
SHRUB	9.0	2	0.1	0.03	1.6
SAV	9.0	2	1.4	0.25	5.0
DBF	9.0	2	0.15	0.04	1.6
ENF	9.0	2	0.075	0.02	1.6
EBF	9.0	2	0.15	0.04	1.6
CROC3	11.0	8	1.4	0.25	5.0
GRAC4/CROC4	5.0	2	0.735	0.13	5.0

PFTs are tundra (TDA), C3 grassland (GRAC3), shrubland (SHR), savanna (SAV), deciduous broadleaf forest (DBF), evergreen needleleaf forest (ENF), evergreen broadleaf forest (EBF), C3 cropland (CROC3) and C4 grassland/cropland (GRAC4/CROC4). *m* and *b* are the slopes and intercepts when calculating stomatal conductance (Eq. (2)). Parameter *a* represents the O_3 damaging sensitivity dependent on vegetation types with a range from low (*a_low*) to high (*a_high*) values. $F_{O3,crit}$ is a critical threshold for damage.

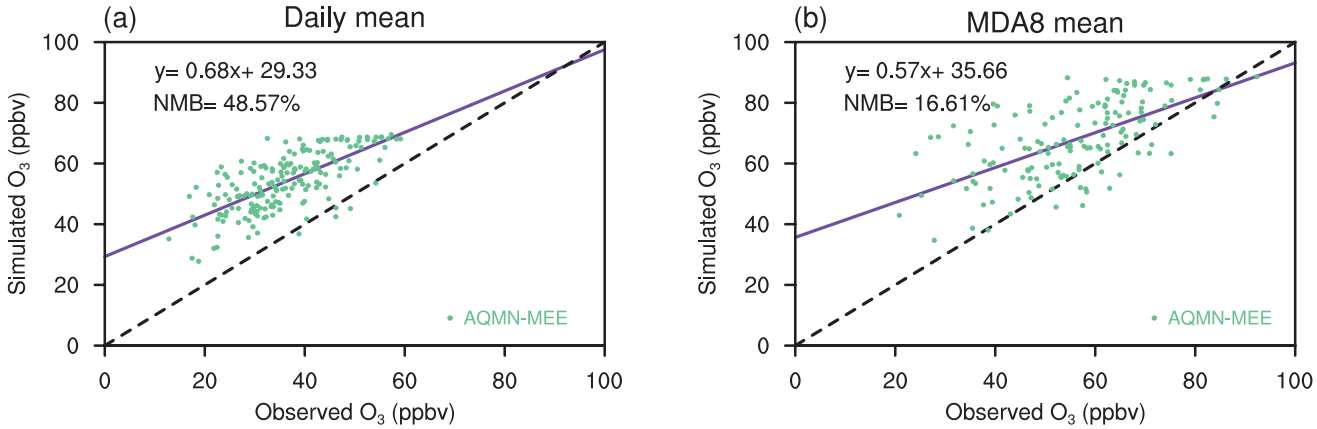

Figure S1. Scatter plots of (a) daily (24-h average) mean and (b) MDA8 (maximum daily 8-hour average) O_3 concentrations (ppbv) over observational sites in China. The purple line shows the linear regression between the observed and simulated O_3 concentrations. The black dashed line shows the 1:1 lines.

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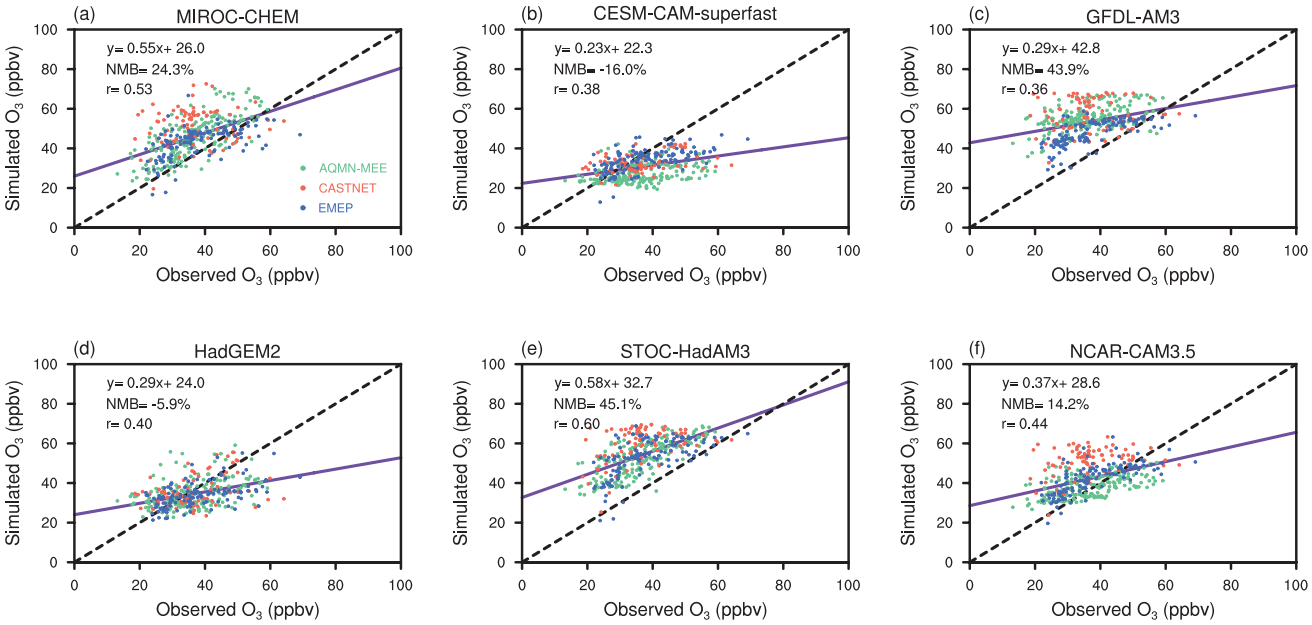

Figure S2. Evaluations of summer (June-August) daily (24-h average) surface O_3 concentrations ($[O_3]$) simulated by six models from the ACCMIP dataset. Observed ground-level $[O_3]$ are collected from networks of AQMN-MEE in China, CASTNET in U.S. and EMEP in Europe. Simulated surface $[O_3]$ are interpolated to the observational sites by using the bilinear interpolation method. The purple line shows the linear regression between observations and simulations for individual models. The black dashed line shows the 1:1 lines.

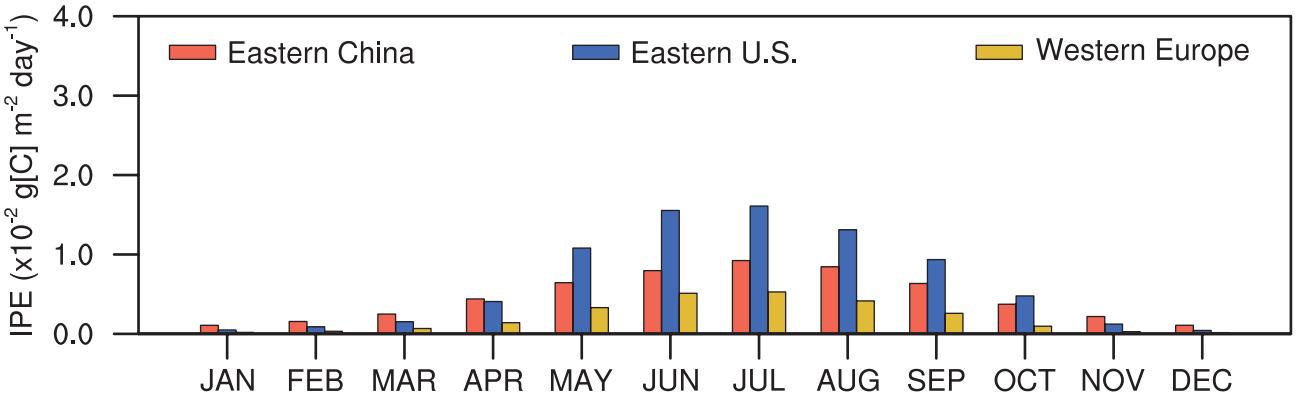

Figure S3. Monthly mean isoprene emissions (IPE) in the CTRL simulation averaged over eastern China, eastern U.S. and western Europe, respectively.

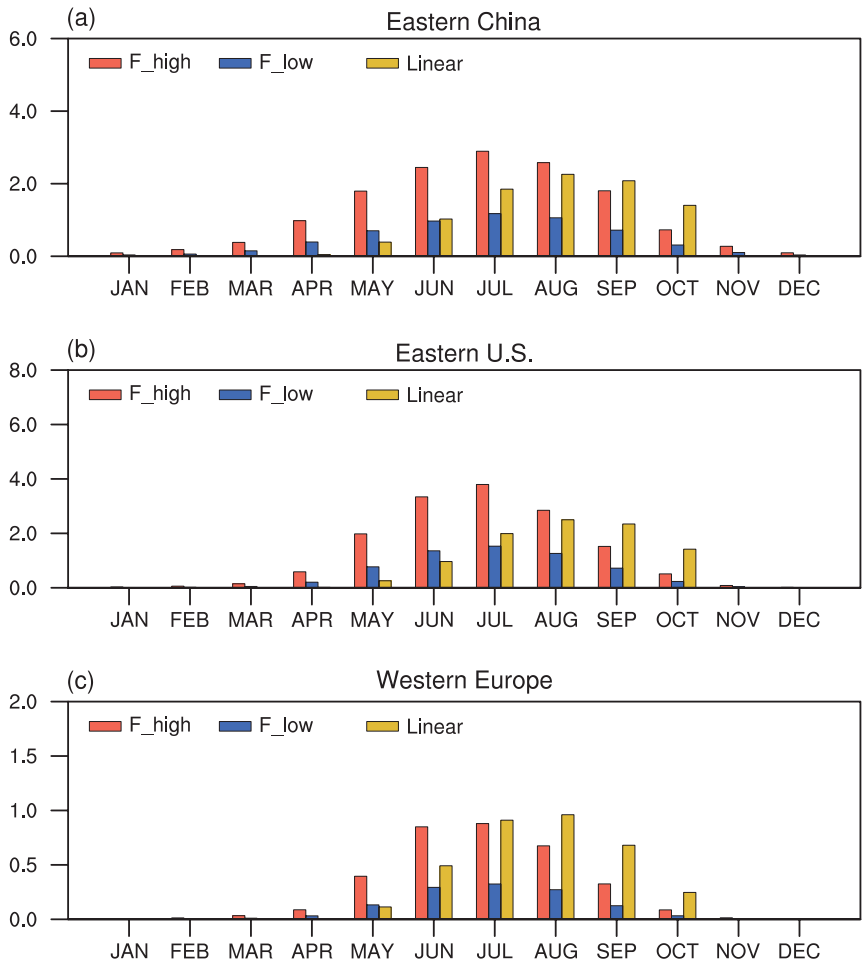

Figure S4. Monthly mean absolute O_3 damage to IPE (10^{-3} g[C] m^{-2} day^{-1}) averaged over (a) eastern China, (b) the eastern U.S. and (c) western Europe by using the F scheme with high/low sensitivities and the linear scheme, respectively.

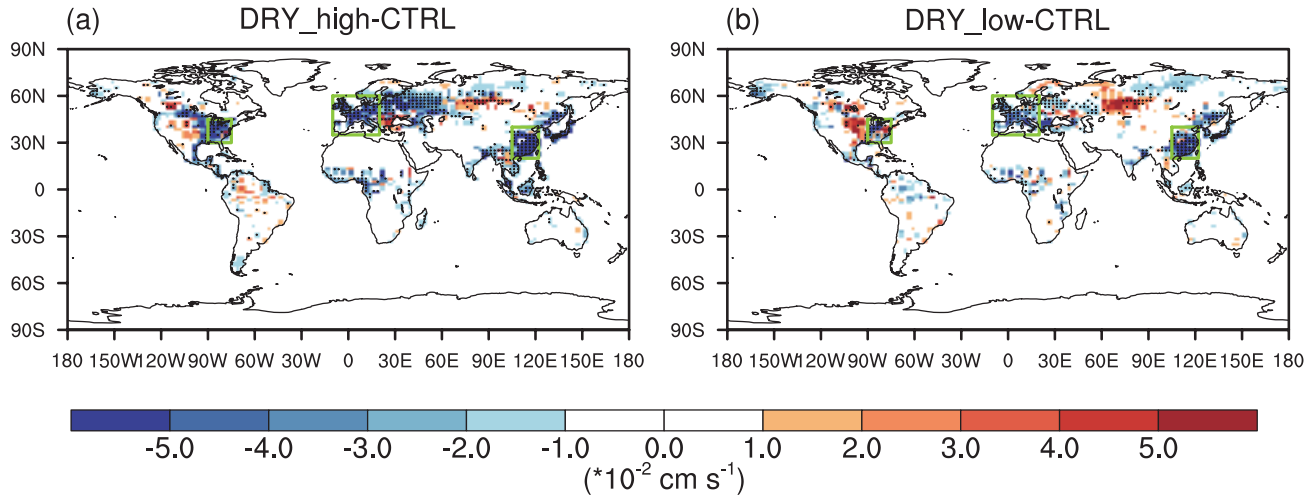

Figure S5. Effects of O_3 damage to photosynthesis and stomatal conductance on summertime O_3 dry deposition velocity (cm s^{-1}) with (a) high and (b) low damaging sensitivities. Dotted grids indicate significant changes (p<0.05) due to O_3 damages to photosynthesis and stomatal conductance. Intense changes in Eastern China, eastern U.S., and western Europe are highlighted by three green boxes.

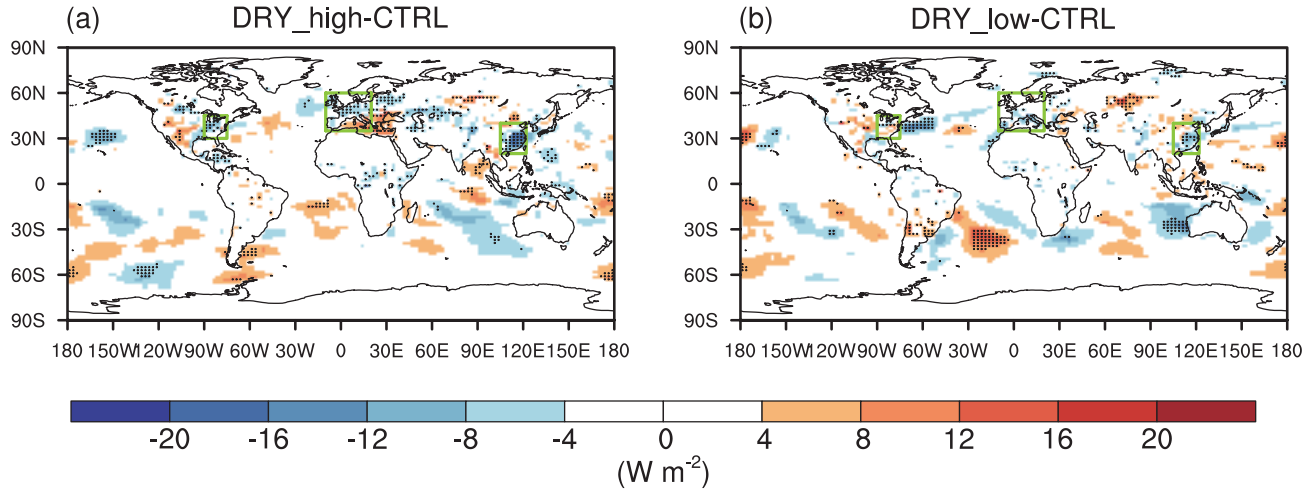

Figure S6. Same as Fig. S5 but for the latent heat flux (W m^{-2}).

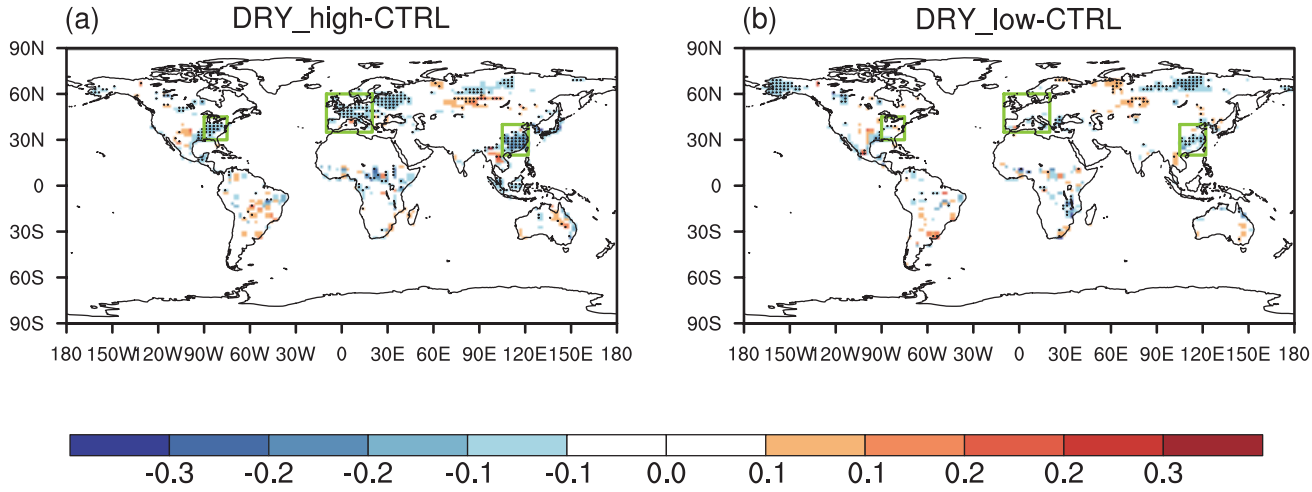

Figure S7. Changes of LAI due to O_3 damages to photosynthesis in summer for (a) high and (b) low sensitivity. Dotted grids indicate significant changes at 95% confidence.

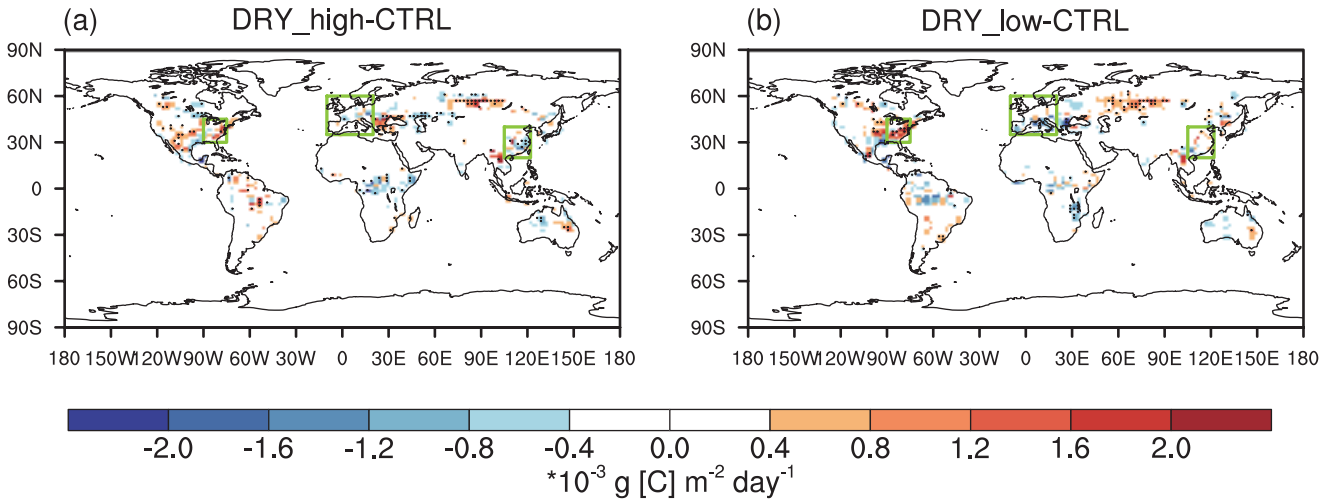

Figure S8. Same as Fig. S5 but for feedbacks on IPE, which are led by the effect of O_3 damage to photosynthesis and stomatal conductance.