Biogeosciences

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Supplement of

Neglecting plant–microbe symbioses leads to underestimation of modeled climate impacts

Mingjie Shi et al.

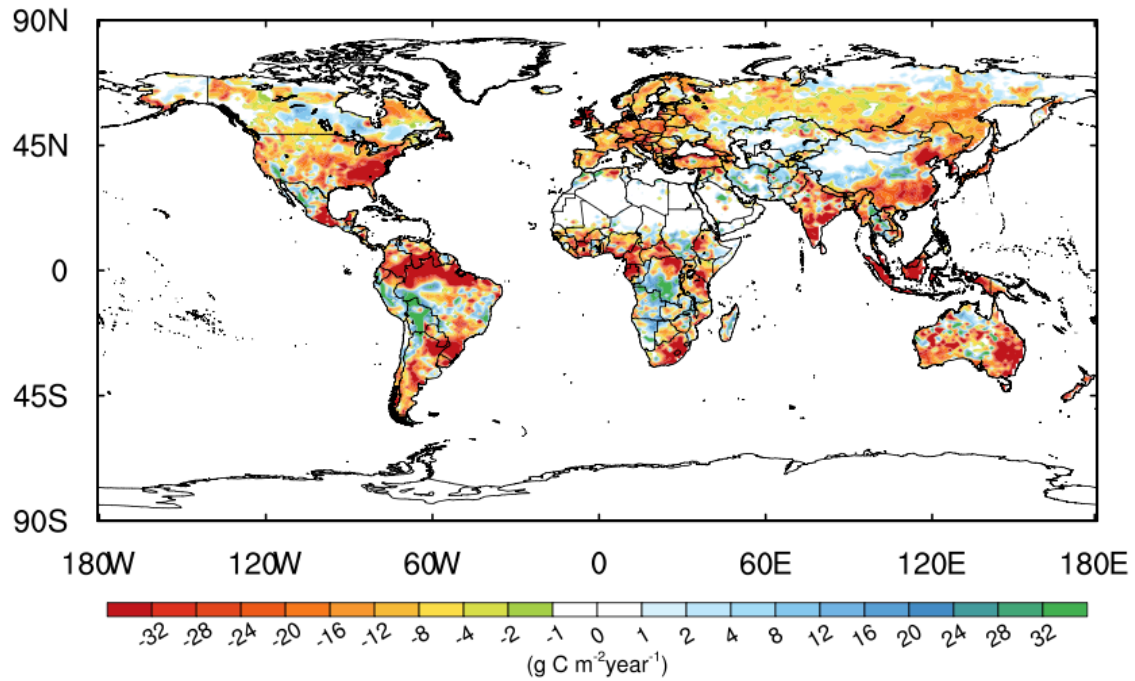*Correspondence to:* Edward R. Brzostek (erbrzostek@mail.wvu.edu)

Figure S1. Impacts of parameter adjustments in FUN on predicted global NPP in CLM. Values represent the mean difference between the original parameterization and the new parameterization for the last ten years of the simulation from 1995-2004. On a global scale, the new parameterization reduced NPP from 50.8 Pg C yr^{-1} to 49.3 Pg C yr^{-1}.

Figure S2. Absolute values of (a) NPP, (b) LAI, and (c) ET in CAM without CLM-FUN. These values represent the mean of the last ten years of the simulation from 1995-2004.

(a)

90N
45N
0
45S
90S

180W 120W 60W 0 60E 120E 180E

0.0 10 50 100 150 200 250 300 350 400 450 500 550 600 650 700 750 800 (g C m^{-2} yr^{-1})

(b)

90N
45N
0
45S
90S

180W 120W 60W 0 60E 120E 180E

0.0 0.1 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 (m^2 m^{-2})

(c)

90N
45N
0
45S
90S

180W 120W 60W 0 60E 120E 180E

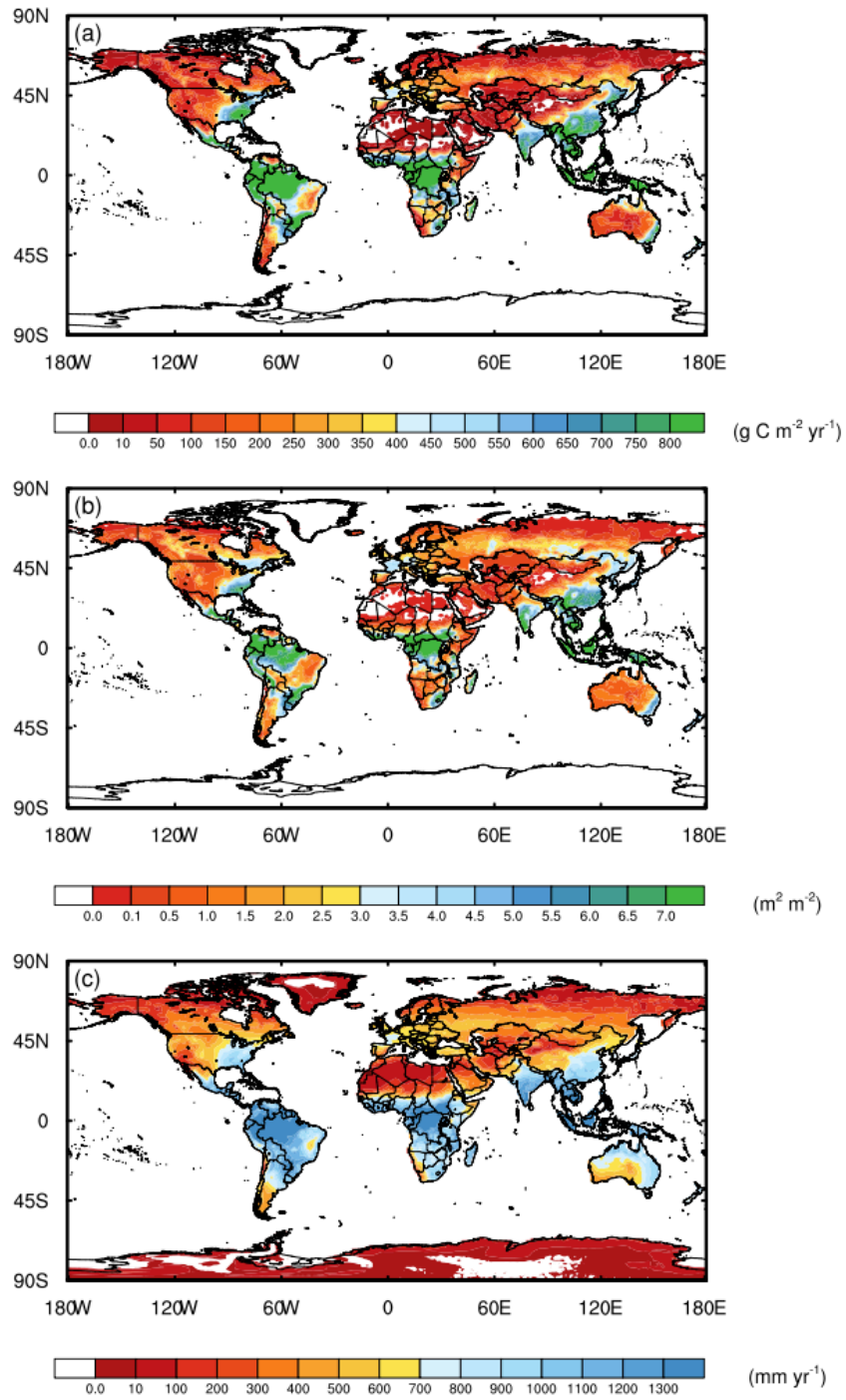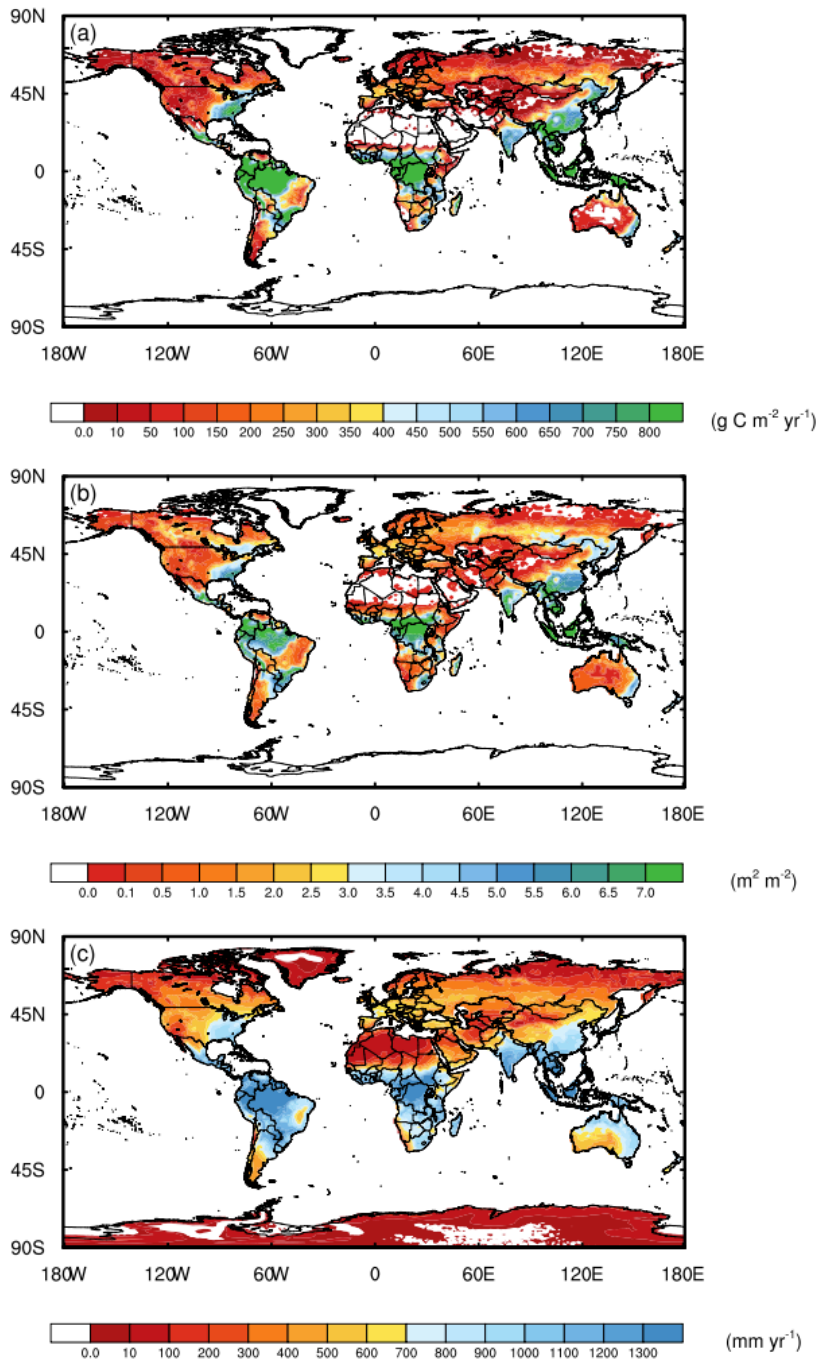0.0 10 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 (mm yr^{-1})

Figure S3. Absolute values of (a) NPP, (b) LAI, and (c) ET in CAM with CLM-FUN.
These values represent the mean of the last ten years of the simulation from 1995-2004.
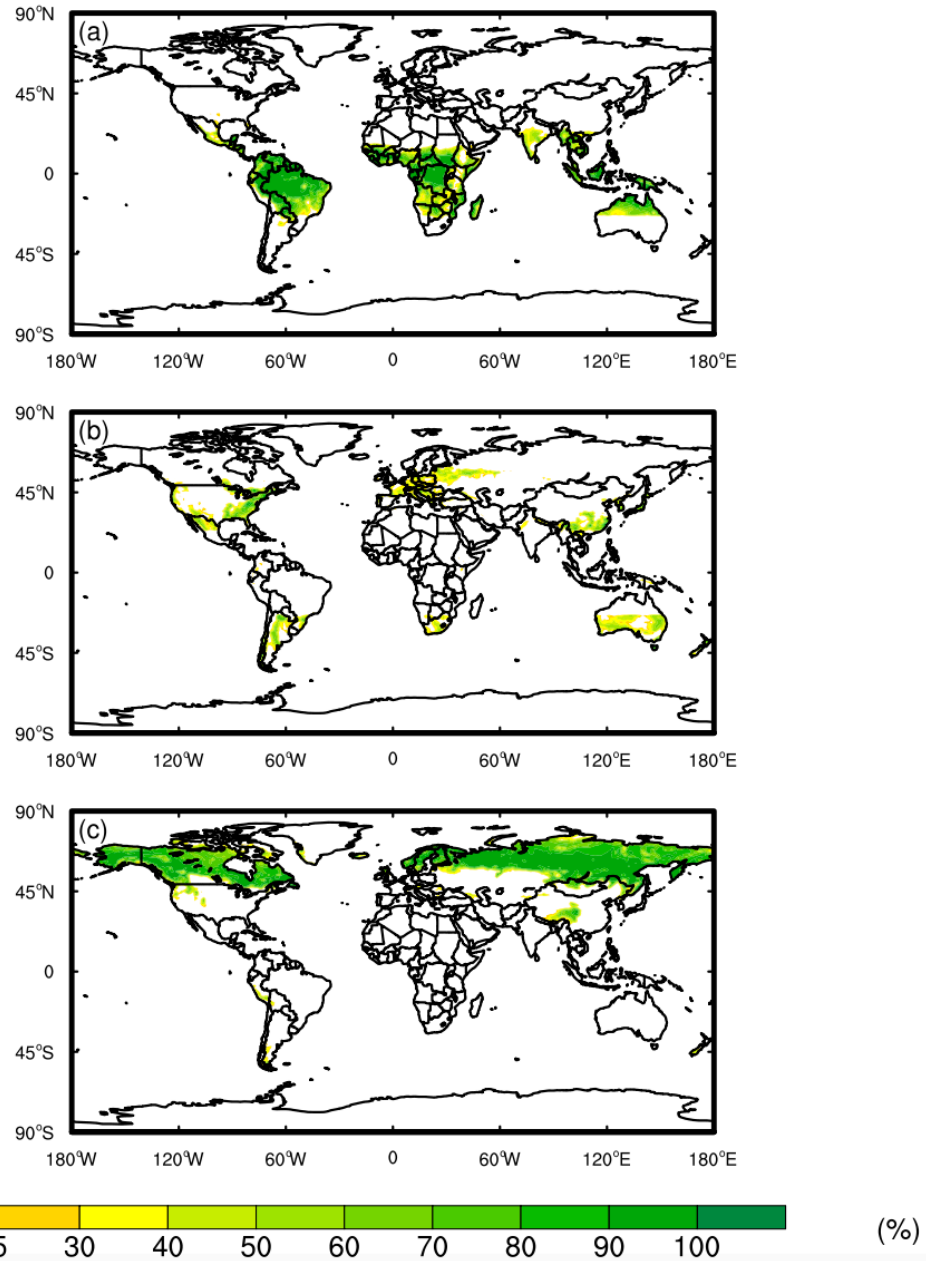
Figure S4. Global maps of three key biome classes that were analyzed for regional shifts in temperature and precipitation: (a) tropical forests, (b) temperate forests, and (c) boreal and alpine forests. Areas were delineated by grid cells that contained greater than 25% of each plant functional type.

Table S1. The adjusted parameters in CLM-FUN

Cost Parameter	Original[a]	Updated
AK_C	2.7×10^{-4}	6.2
AK_N	5.5×10^{-5}	5.5×10^{-5}
EK_C	1.6×10^{-3}	34.1
EK_N	2.7×10^{-4}	2.7×10^{-4}
K_C	5.5×10^{-5}	5.5×10^{-5}
K_N	3.3×10^{-3}	3.3×10^{-3}
K_R	$8.0/4.4 \times 10^{-4}$ [b]	$8.0/4.4 \times 10^{-4}$ [b]

[a] The parameter values used in Shi *et al*. [2016].

[b] 8.0 was used for deciduous plant functional types (PFTs) and 4.4×10^{-4} was used for evergreen PFTs.