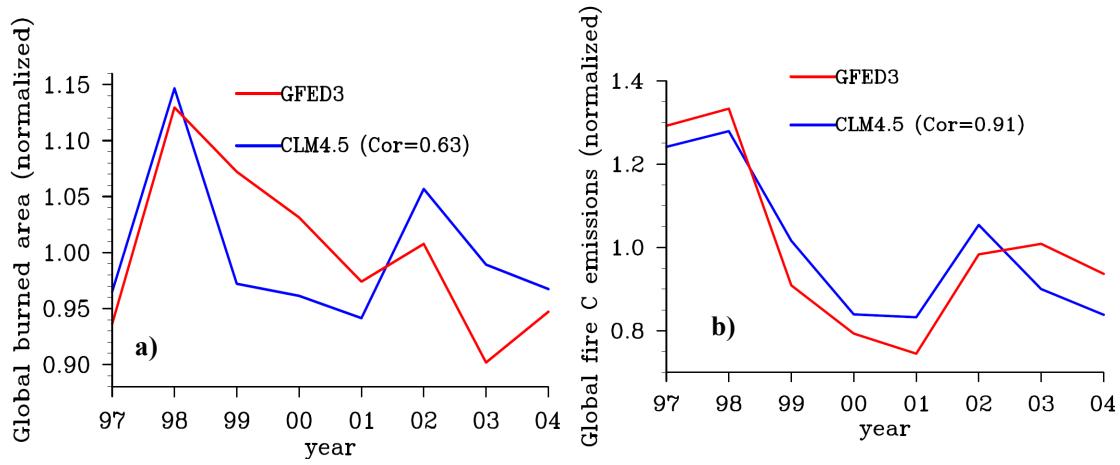


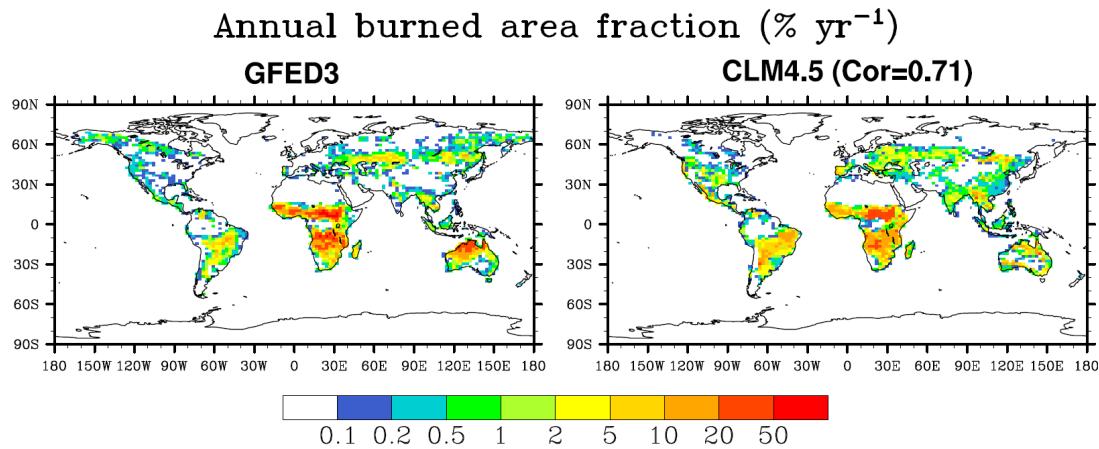
**Table S1.** PFT-specific combustion completeness factors for leaves ( $CC_{leaf}$ ), stems ( $CC_{stem}$ ), roots ( $CC_{root}$ ), and transfer and storage carbon ( $CC_{ts}$ ); mortality factors for leaves ( $M_{leaf}$ ), live stems ( $M_{livestem,1}$ ), dead stems ( $M_{deadstem}$ ), roots ( $M_{root}$ ), and transfer and storage carbon ( $M_{ts}$ ) related to the carbon transfers from these pools to litter pool; mortality factors for live stems ( $M_{livestem,2}$ ) related to the carbon transfer from live stems to dead stems.

PFT	$CC_{leaf}$	$CC_{stem}$	$CC_{root}$	$CC_{ts}$	$M_{leaf}$	$M_{livestem,1}$	$M_{deadstem}$	$M_{root}$	$M_{ts}$	$M_{livestem,2}$
<b>Tree:</b>										
NET Temperate	0.80	0.27	0.00	0.55	0.80	0.15	0.15	0.15	0.55	0.40
NET Boreal	0.80	0.27	0.00	0.55	0.80	0.15	0.15	0.15	0.55	0.40
NDT Boreal	---	---	---	---	---	---	---	---	---	---
BET Tropical	0.80	0.25	0.00	0.50	0.80	0.13	0.13	0.13	0.50	0.37
BET Temperate	0.80	0.25	0.00	0.50	0.80	0.13	0.13	0.13	0.50	0.37
BDT Tropical	0.80	0.25	0.00	0.50	0.80	0.10	0.10	0.10	0.50	0.30
BDT Temperate	0.80	0.25	0.00	0.50	0.80	0.10	0.10	0.10	0.50	0.30
BDT Boreal	0.80	0.25	0.00	0.50	0.80	0.13	0.13	0.13	0.50	0.37
<b>Shrub:</b>										
BES Temperate	---	---	---	---	---	---	---	---	---	---
BDS Temperate	0.80	0.30	0.00	0.60	0.80	0.17	0.17	0.17	0.60	0.43
BDS Boreal	0.80	0.30	0.00	0.60	0.80	0.17	0.17	0.17	0.60	0.43
<b>Grass:</b>										
$C_3$ arctic grass	0.80	0.80	0.00	0.80	0.80	0.20	0.20	0.20	0.80	0.60
$C_3$ grass	0.80	0.80	0.00	0.80	0.80	0.20	0.20	0.20	0.80	0.60
$C_4$ grass	0.80	0.80	0.00	0.80	0.80	0.20	0.20	0.20	0.80	0.60
<b>Crop:</b>										
Crop1	0.80	0.80	0.00	0.80	0.80	0.20	0.20	0.20	0.80	0.60
Crop2	---	---	---	---	---	---	---	---	---	---

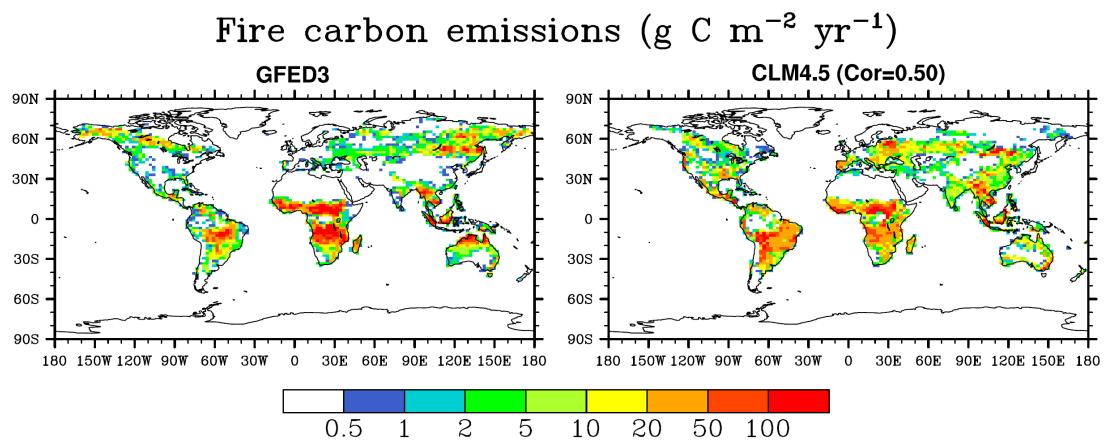
Abbreviations in the PFT names: N (needleleaf), B (broadleaf), E (evergreen), D (deciduous), T (tree), S (Shrub).



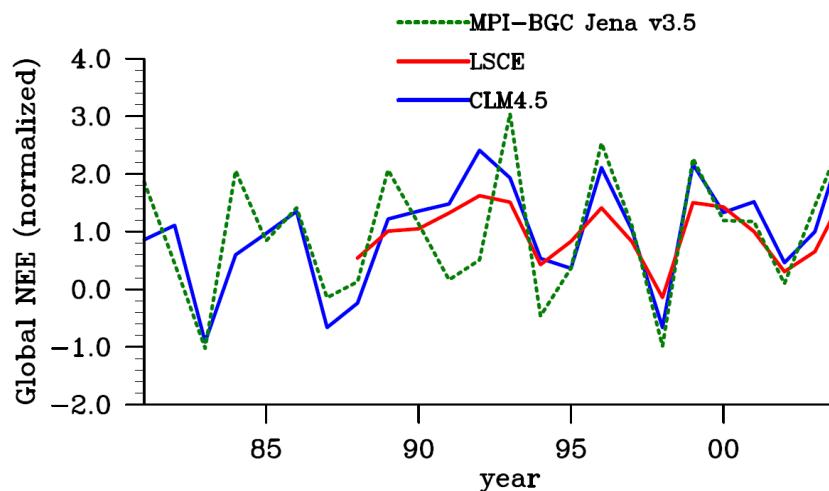
**Fig. S1.** (a) Annual global burned area and (b) fire carbon emissions normalized by the mean for 1997–2004 from GFED3 and CLM4.5 simulations. The numbers in brackets denote temporal correlation between GFED3 and simulations.



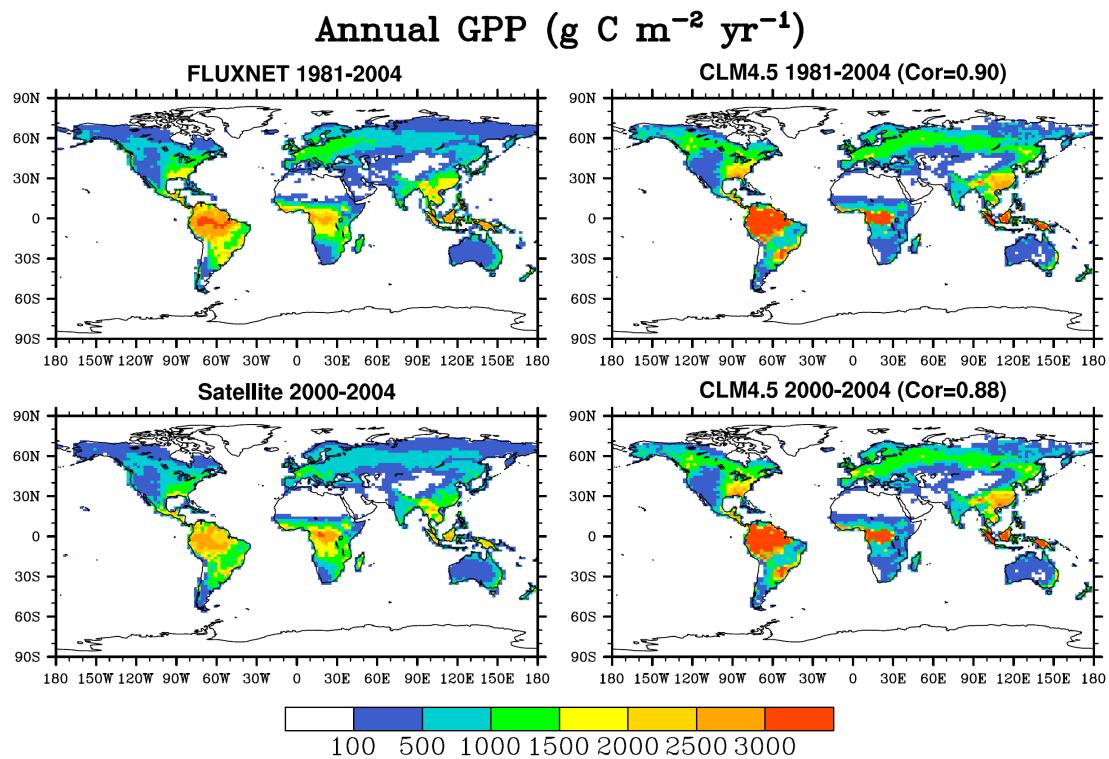
**Fig. S2.** Spatial distribution of annual burned area fraction averaged over 1997–2004 for GFED3 and CLM4.5. The global spatial correlation (Cor) between GFED3 and CLM4.5 simulation is also given.



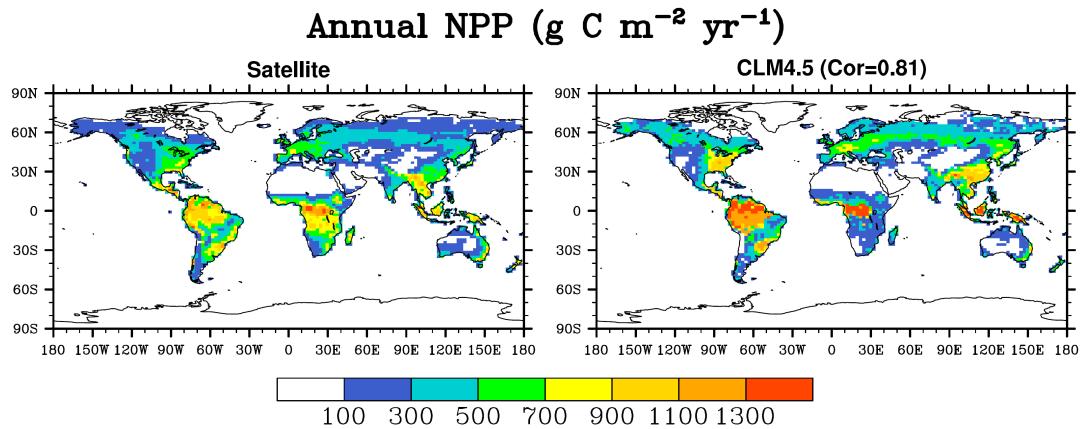
**Fig. S3.** Same as Fig. S2, but for fire carbon emissions.



**Fig. S4.** Annual global net ecosystem exchange (NEE) normalized by the mean from MPI-BGC Jena v3.5, and LSCE, and CLM4.5 simulation. A negative sign indicates a land uptake of carbon.



**Fig. S5.** Spatial distribution of annual gross primary production (GPP) from FLUXNET-based and Satellite-based estimates and CLM4.5 simulations.



**Fig. S6.** Spatial distribution of annual net primary production (NPP) from Satellite-based estimates and CLM4.5 simulation