Electronic Supplementary Material B to Climate and Vegetation Drivers of Terrestrial Carbon Fluxes: A Global Data Synthesis*

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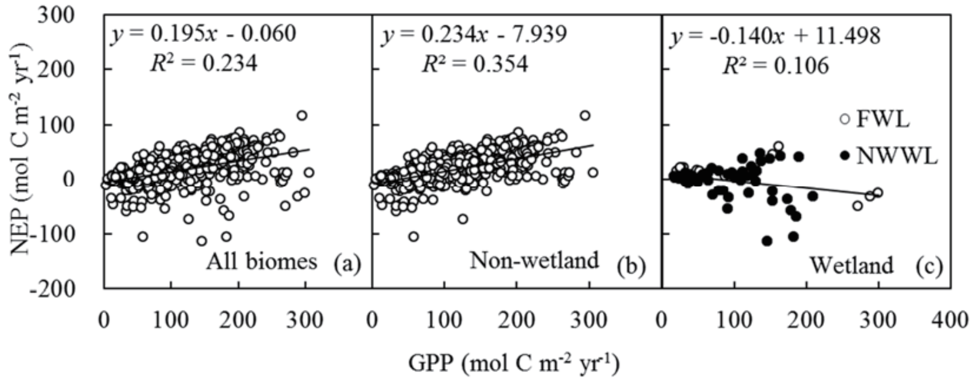

Fig. S1. Relationship between NEP and GPP: (a) all biomes; (b) non-wetland; (c) wetland. The P values in (a, b) are less than 0.001; the P value in panel (c) is 0.002.

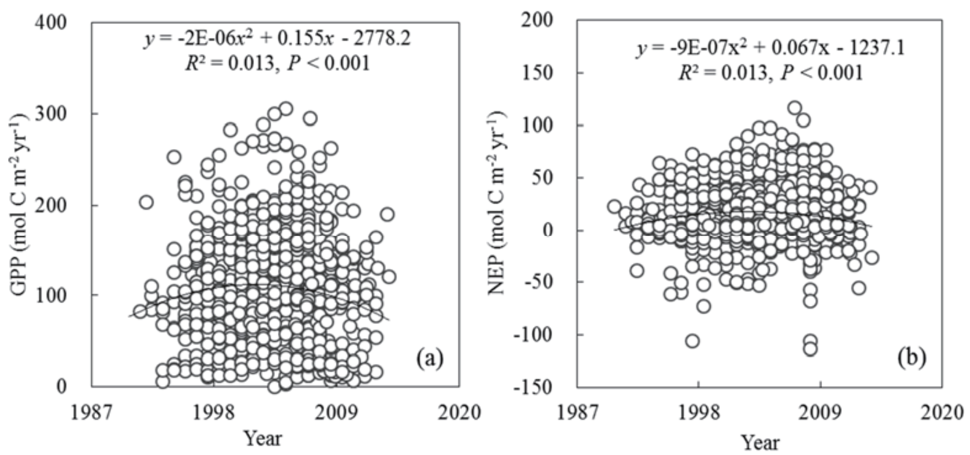

Fig. S2. Temporal variations in (a) GPP and (b) NEP.

*The online version of this article can be found at https://doi.org/10.1007/s00376-019-8194-y.

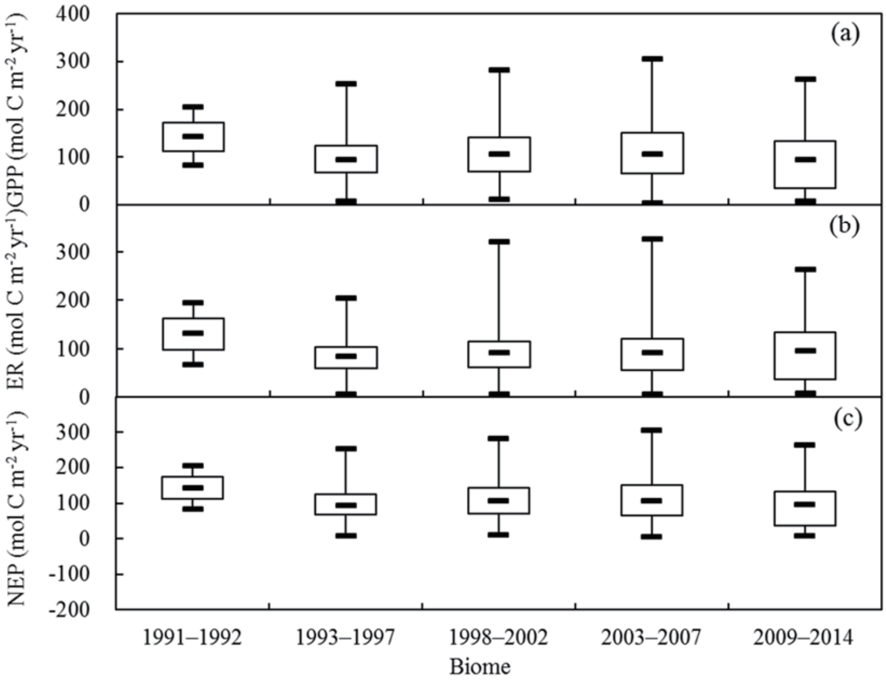

Fig. S3. Box-and-whisker plots for carbon fluxes at a five-year timescale: (a) GPP; (b) ER; (c) NEP.

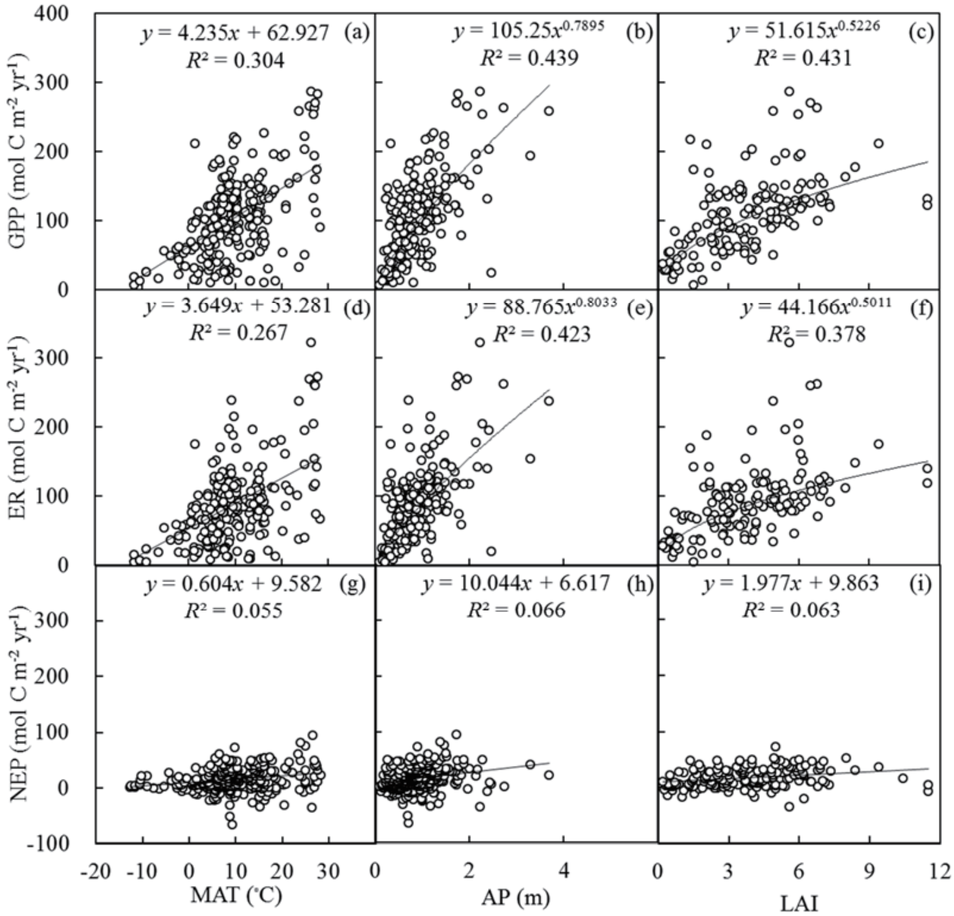

Fig. S4. Relationship between fluxes (GPP, ER and NEP) and environmental variables for all biomes on the basis of the averaged multiple-year fluxes and multiple-year environmental variables at each site. The P values in all panels are 0.001 or less than 0.001.

Table S1. Median values of GPP and ER at different MAT and AP scales.

	GPP (mol C m^{-2} yr^{-1})			ER (mol C m^{-2} yr^{-1})		
	< 10°C	10°C–20°C	> 20°C	< 10°C	10°C–20°C	> 20°C
< 0.4 m	27.788	37.283	55.558	25.405	44.042	44.333
0.4–0.8 m	60.875	99.667	89.333	47.042	82.175	70.417
0.8–1.5 m	97.083	116.783	188.750	87.500	97.583	141.167
> 1.5 m	128.750	140.708	259.000	117.375	86.792	234.958

Table S2. Standardized coefficients and relative contribution of each potential factor to GPP, ER and NEP in the stepwise linear regression. Three types of stepwise linear regression functions were used: $Y_c = a\text{MAT} + b\text{AP} + d$ (type 1); $Y_c = a\text{MAT} + b\text{AP} + c\text{LAI} + d$ (type 2); $Y_c = a\text{MAT} + c\text{LAI} + d$ (type 3). Here, a, b and c are parameters, and d is a constant.

Flux	Biome types	Model type	Standardized coefficient			Relative contribution		
			a	*b*	*c*	MAT	AP	LAI
GPP	All biomes	Type 1	0.336	0.334	0.000	0.501	0.499	0.000
		Type 2	0.429	0.170	0.436	0.414	0.164	0.421
	Non-wetland	Type 1	0.267	0.446	0.000	0.374	0.626	0.000
		Type 2	0.413	0.170	0.430	0.408	0.168	0.424
	Wetland	Type 3	0.615	0.000	0.320	0.658	0.000	0.342
ER	All biomes	Type 1	0.318	0.342	0.000	0.482	0.518	0.000
		Type 2	0.384	0.248	0.358	0.388	0.251	0.362
	Non-wetland	Type 1	0.242	0.492	0.000	0.330	0.670	0.000
		Type 2	0.342	0.263	0.357	0.356	0.273	0.371
	Wetland	Type 3	0.711	0.000	0.196	0.784	0.000	0.216
NEP	All biomes	Type 1	0.115	0.161	0.000	0.417	0.583	0.000
		Type 2	0.216	−0.039	0.294	0.424	0.000	0.576
	Non-wetland	Type 1	0.093	0.189	0.000	0.330	0.670	0.000
		Type 2	0.270	−0.040	0.303	0.471	0.000	0.529
	Wetland	Type 1	0.214	0.080	0.000	0.728	0.272	0.000

Table S3. Modeling fluxes of GPP, ER and NEP (mol C m^{-2} yr^{-1}) at different MAT and AP scales.

	Flux	< 10°C				10°C–20°C				> 20°C			
		Model	R^2	n	P	Model	R^2	n	P	Model	R^2	n	P
< 0.4 m	GPP	$27.912e^{(0.055MAT+0.205LAI)}$	0.905	38	< 0.001	$6.394e^{(6.525AP)}$	0.267	36	0.001	ND	–	–	–
	ER	$26.906e^{(0.025MAT+0.191LAI)}$	0.856	38	< 0.001	$6.371e^{(6.291AP)}$	0.269	36	< 0.001	ND	–	–	–
	NEP	$0.995e^{(0.261MAT+0.352LAI)}$	0.732	38	< 0.001	NM	–	–	–	136.270AP–26.516	0.763	9	0.002
0.4–0.8 m	GPP	4.368MAT+13.062LAI+17.839	0.709	145	< 0.001	$160.862e^{(-0.041MAT)}$	0.048	81	0.046	247.850AP–53.919	0.765	5	0.052
	ER	4.184MAT–63.310AP+10.477LAI+54.721	0.651	144	< 0.001	NM	–	–	–	183.400AP–39.435	0.709	5	0.074
	NEP	$1.131e^{(2.703AP+0.167LAI)}$	0.212	182	< 0.001	−2.316AP+3.474LAI+38.266	0.207	80	< 0.001	64.452AP–14.484	0.797	5	0.041
0.8–1.5 m	GPP	9.307MAT+5.450LAI+24.778	0.486	145	< 0.001	93.807AP+31.065	0.121	127	< 0.001	−96.149AP+32.052LAI+122.640	0.949	15	< 0.001
	ER	4.217MAT+34.669AP+5.181LAI+0.419	0.350	145	< 0.001	81.063AP+18.892	0.138	127	< 0.001	−85.950AP+22.942LAI+114.251	0.88	15	< 0.001
	NEP	4.216LAI–1.774	0.218	180	< 0.001	2.5692LAI+18.452	0.041	121	0.026	8.131LAI+2.363	0.655	20	< 0.001
> 1.5 m	GPP	NM	–	–	–	237.350ln(MAT)–495.39	0.543	26	< 0.001	$142.77LAI^{0.3487}$	0.703	14	< 0.001
	ER	ER=38.254ln(LAI)+41.969	0.380	25	0.001	209.220ln(MAT)–447.65	0.508	26	< 0.001	$107.610LAI^{0.4945}$	0.577	14	0.002
	NEP	NM	–	–	–	$428.240e^{(-1.576AP)}$	0.441	43	< 0.001	NM	–	–	–

NM, no suitable model (independent of MAT, AP and LAI); ND, not enough data.

Table S4. Pearson's correlation coefficient matrix for annual carbon fluxes, climate, LAI and GSL maximum carbon fluxes over the growing season.

	GPP	ER	NEP	MAT	AP	LAI	GPP_{max}	ER_{max}	NEP_{max}
ER	0.916***								
NEP	0.484***	0.093***							
MAT	0.480***	0.465***	0.180***						
AP	0.478***	0.478***	0.207***	0.402***					
LAI	0.520***	0.463***	0.303***	0.099***	0.328***				
GPP_{max}	0.550***	0.482***	0.498***	0.337***	0.341***	0.331***			
ER_{max}	0.564***	0.577***	0.370***	0.241**	0.343***	0.049	0.808***		
NEP_{max}	0.379***	0.222**	0.525***	0.198**	0.129*	0.474***	0.667***	0.306***	
GSL	0.386***	0.319***	0.287***	0.216***	0.310***	0.289***	0.199	–0.119	0.280**

Note: single, double and triple asterisks represent P values that are less than 0.05, 0.01 and 0.001, respectively.