

Figure S1. Scatter plots for stations with good agreement ($R^2 \geq 0.85$, $p < 0.05$) of daily temperature from ERA5 reanalysis versus FLUXNET data sets. The period is specified in the parentheses of the plot title.

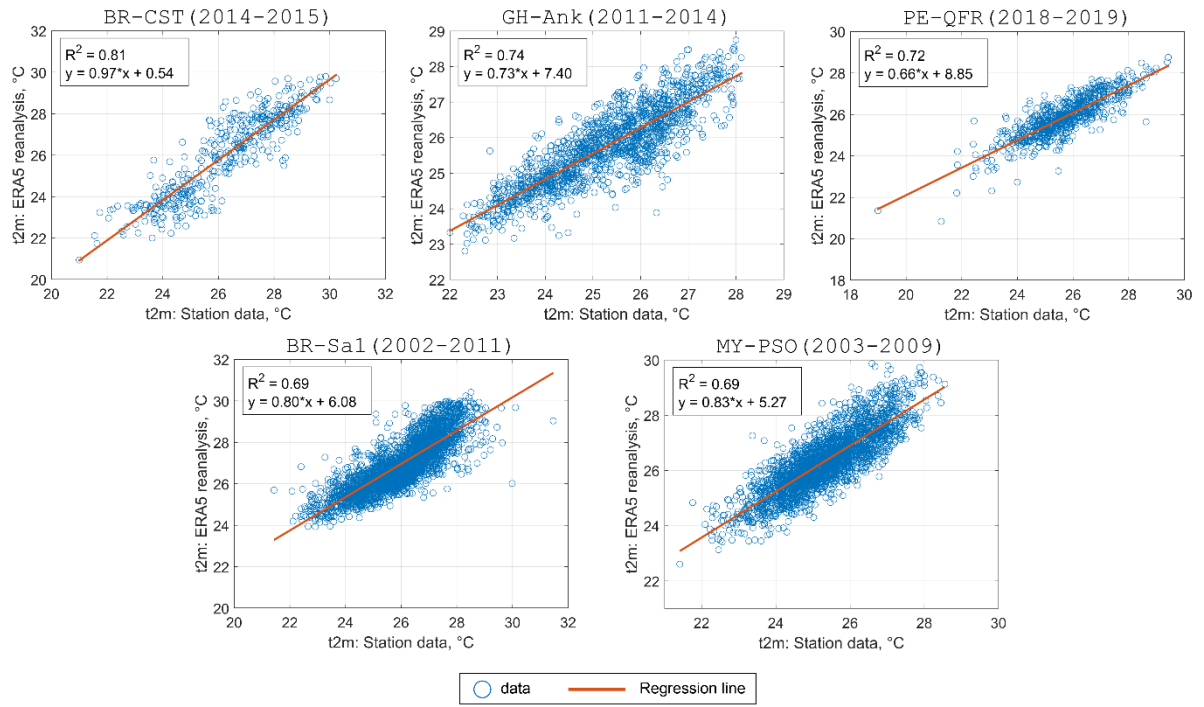


Figure S2. Scatter plots for stations with moderate agreement ($R^2 < 0.85$, $p < 0.05$) of daily temperature from ERA5 reanalysis versus stations data sets. The period is specified in the parentheses of plot title.

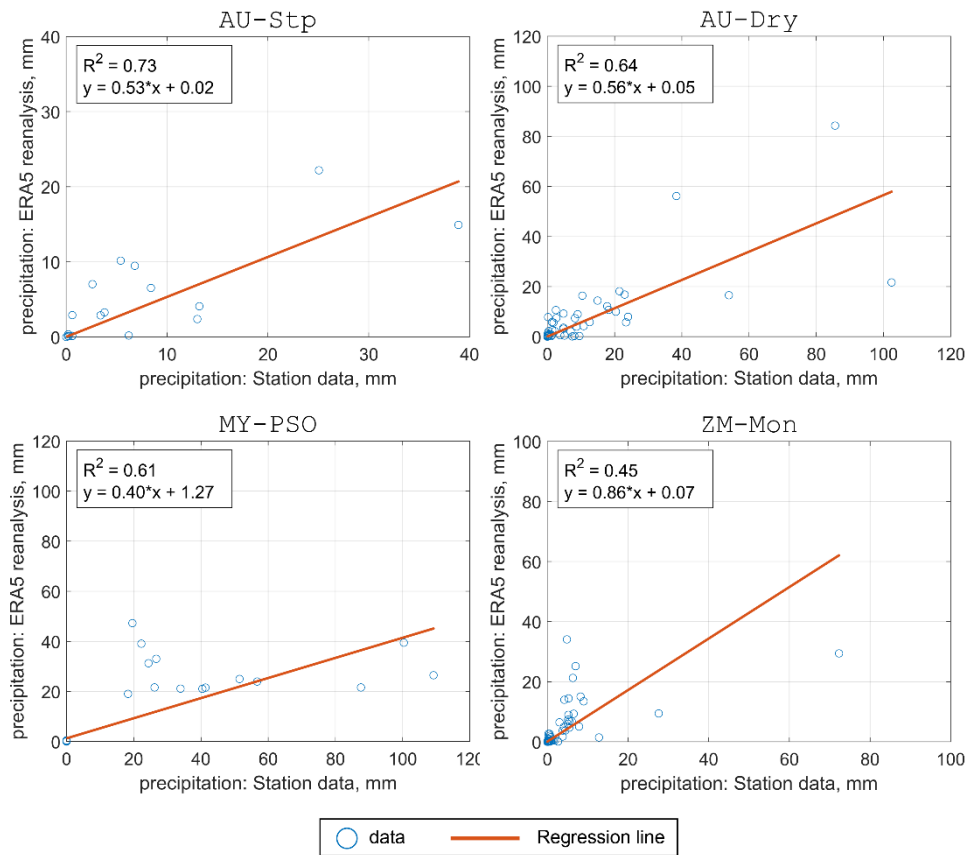


Figure S3. Scatter plots for stations of daily precipitation amount from the ERA5 reanalysis versus FLUXNET data sets with a period of observations longer than six years. The days when the daily precipitation from reanalysis and flux monitoring stations simultaneously exceeds the threshold 95% quantile (defined on the reanalysis data set) are considered. The period is specified in the parentheses of the plot title.

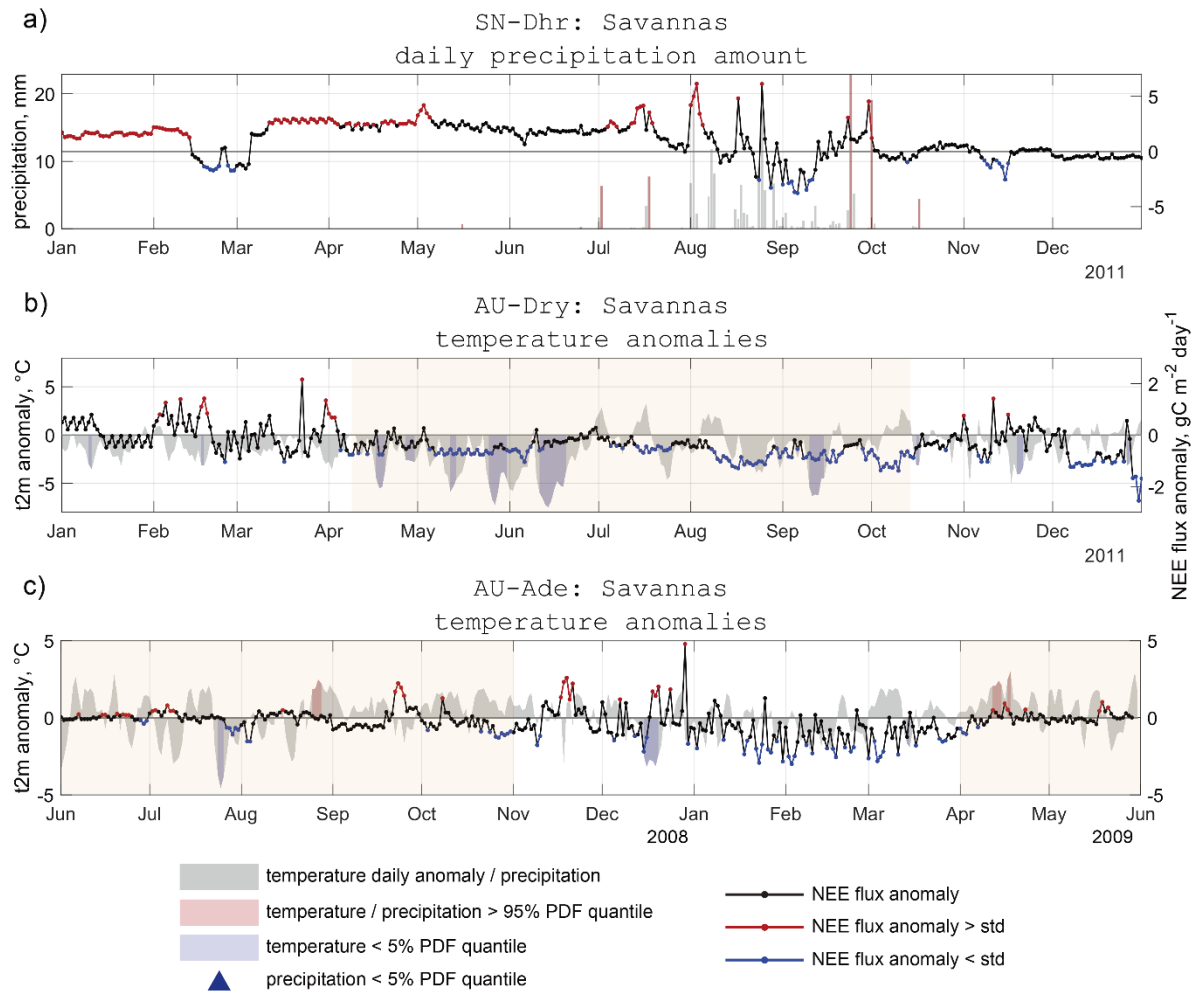


Figure S4. The time series of CO₂ flux anomaly and daily precipitation amount (a), daily temperature anomaly (b,c) in savannas at flux monitoring station SN-Dhr for 2011 (a), AU-Dry for 2011 (b) and AU-Ade for June 2008-June 2009. The days when the CO₂ flux anomalies were greater (lower) than 1STD are marked by red (blue) points. The red (blue) shading is applied for the periods when temperature anomalies exceed the upper (low) threshold: 95% (5%) PDF quantile. The red shaded column (blue triangle) is applied for the days when precipitation daily amount exceeds the upper (low) threshold: 95% (5%) PDF quantile. The yellow shading corresponds to the dry period.

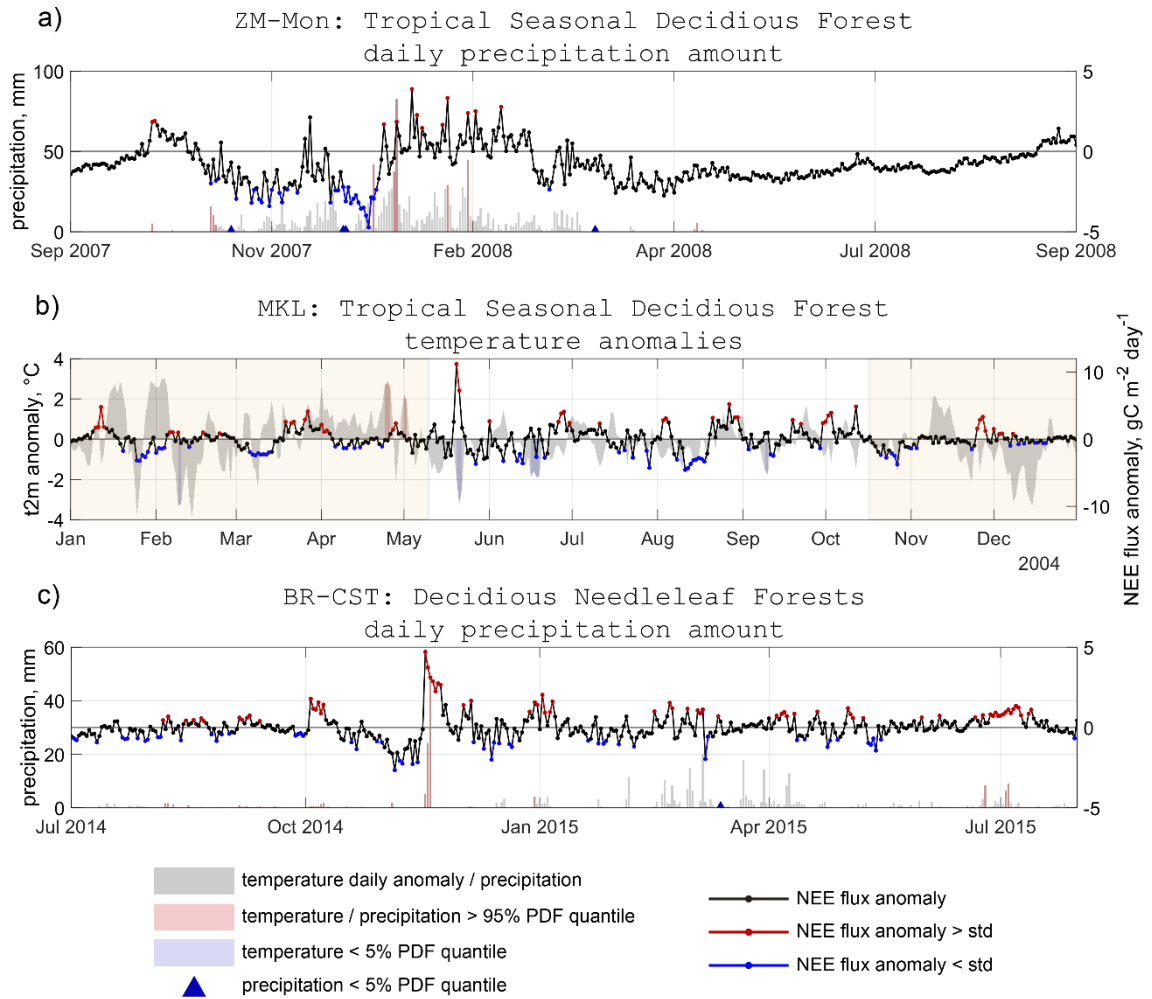


Figure S5. The time series of CO₂ flux anomaly and daily precipitation amount (a,c), daily temperature anomaly (b) in tropical seasonal or dry forests at flux monitoring station ZM-Mon for September 2007-September 2008 (a), MKL for 2004 (b) and BR-CST for June 2014-July 2015. The days when the CO₂ flux anomalies were greater (lower) than 1STD are marked by red (blue) points. The red (blue) shading is applied for the periods when temperature anomalies exceed the upper (lower) threshold: 95% (5%) PDF quantile. The red shaded column (blue triangle) is applied for the days when precipitation daily amount exceeds the upper (lower) threshold: 95% (5%)PDF quantile. The yellow shading corresponds to the dry period.

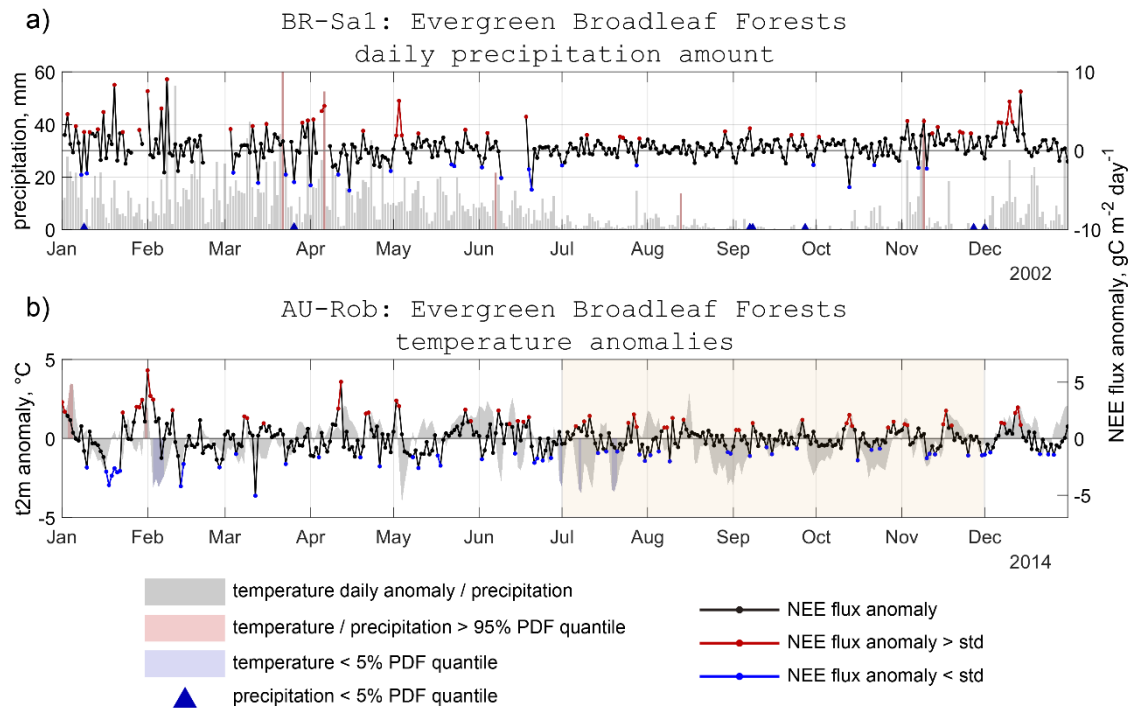


Figure S6. The time series of CO₂ flux anomaly and daily precipitation amount (a), daily temperature anomaly (b) in evergreen broadleaf forests at flux monitoring station BR-Sa1 for 2002 (a), AU-Rob for 2014 (b). The days when the CO₂ flux anomalies were greater (lower) than 1STD are marked by red (blue) points. The red (blue) shading is applied for the periods when temperature anomalies exceed the upper (low) threshold: 95% (5%) PDF quantile. The red shaded column (blue triangle) is applied for the days when precipitation daily amount exceeds the upper (low) threshold: 95% (5%)PDF quantile. The yellow shading corresponds to the dry period

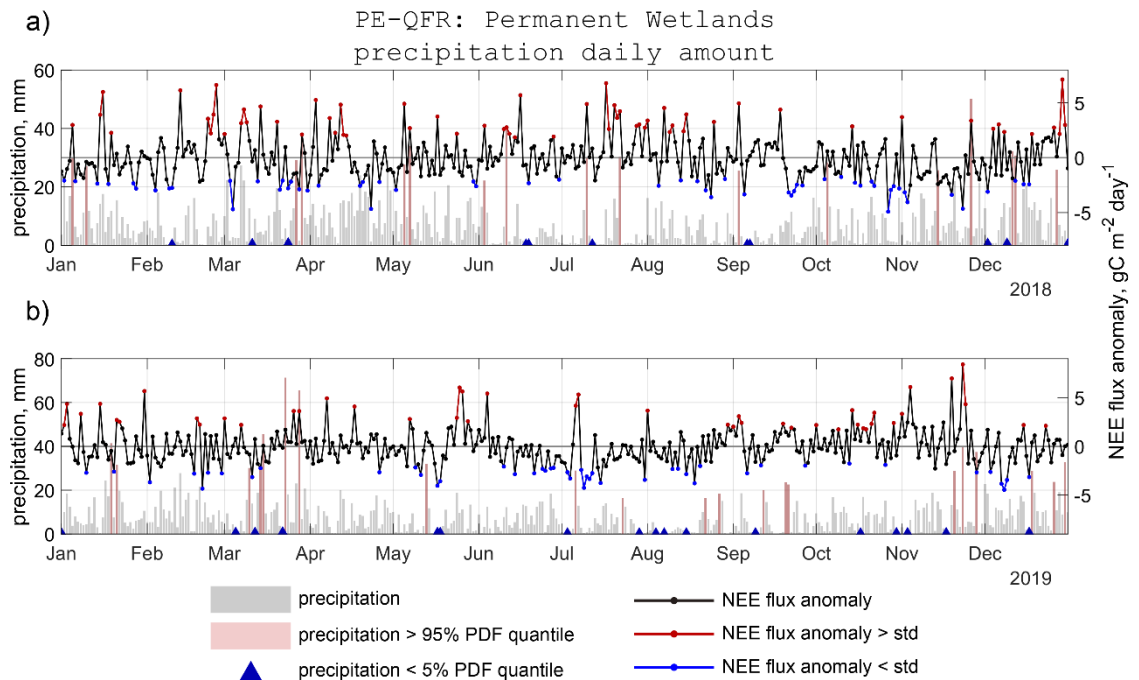


Figure S7. The time series of CO₂ flux anomaly and daily precipitation amount in wetlands at flux monitoring station PE-QFR for 2018 (a), 2019 (b). The days when the CO₂ flux anomalies were greater (lower) than 1STD are marked by red (blue) points. The red shading (blue triangle) is applied for the periods when precipitation exceed the upper (low) threshold: 95% (5%) PDF quantile.

Table S1. The number of samples (days) used for calculation of the correlation between the daily CO₂ flux and temperature/precipitation anomalies.

Types of tropical ecosystems	Stations	Number of samples (days), when the threshold is exceeded				
		T Std	T Q90	T Q95	P Q90	P Q95
Savannas	AU-Ade	177	49	15	38	10
	AU-Dry	648	210	94	181	101
	AU-RDF	378	87	32	101	48
	CG-Tch	240	109	40	119	52
	SD-Dem	406	150	60	61	22
	SN-Dhr	422	166	72	123	71
Evergreen broadleaf forests	BR-Sa1	800	231	89	244	102
	AU-Rob	88	22	7	28	10
	GH-Ank	331	142	54	129	53
	MY-PSO	715	225	109	192	78
Grasslands	AU-Stp	767	199	78	150	54
Permanent wetlands	AU-Fog	324	38	14	96	39
	PE-QFR	206	74	37	80	38
Deciduous needleleaf forest	BR-CST	114	46	18	52	30
Tropical rain forest	BNS	278	84	36	111	53
Tropical season deciduous forest	MKL	94	28	9	19	8
	Zm-Mon	987	304	127	255	136