

Experimental Sites. We based our study on a decadal (2000–2009) dataset of MODIS Enhanced Vegetation Index (EVI) and precipitation from 12 United States Department of Agriculture (USDA) long-term experimental sites in the conterminous United States and Puerto Rico and 17 similar sites in the Australian continent. The experimental sites encompass a range of precipitation regimes and capture similar biome types on both continents (Table 1). Results for USDA₀₀₋₀₉ and Australia₀₁₋₀₉ sites were compared with previously-published results based on a dataset composed primarily of Long-term Ecological Research (LTER) sites covering 14 sites with measurements made during the period from about 1975–1998, hereafter referred to as the LTER₇₅₋₉₈ dataset (Table 1; Figures 1–4). To validate the relation between annually integrated EVI (iEVI) and annual above-ground net primary production (ANPP) for the dataset in this study, *in situ* estimates of ANPP (ANPP_G) during the period 2000–2009 were compiled for 10 sites across the United States (Table 2), resulting in the analysis presented in Figure 1 in the main text. Three of these sites were used to validate results (LTER₀₀₋₀₉, Table 1). The Palmer Drought Severity Index (PDSI, see Methods) indicated drought duration and severity at these sites during the 2000–2009 study period (Table 3).

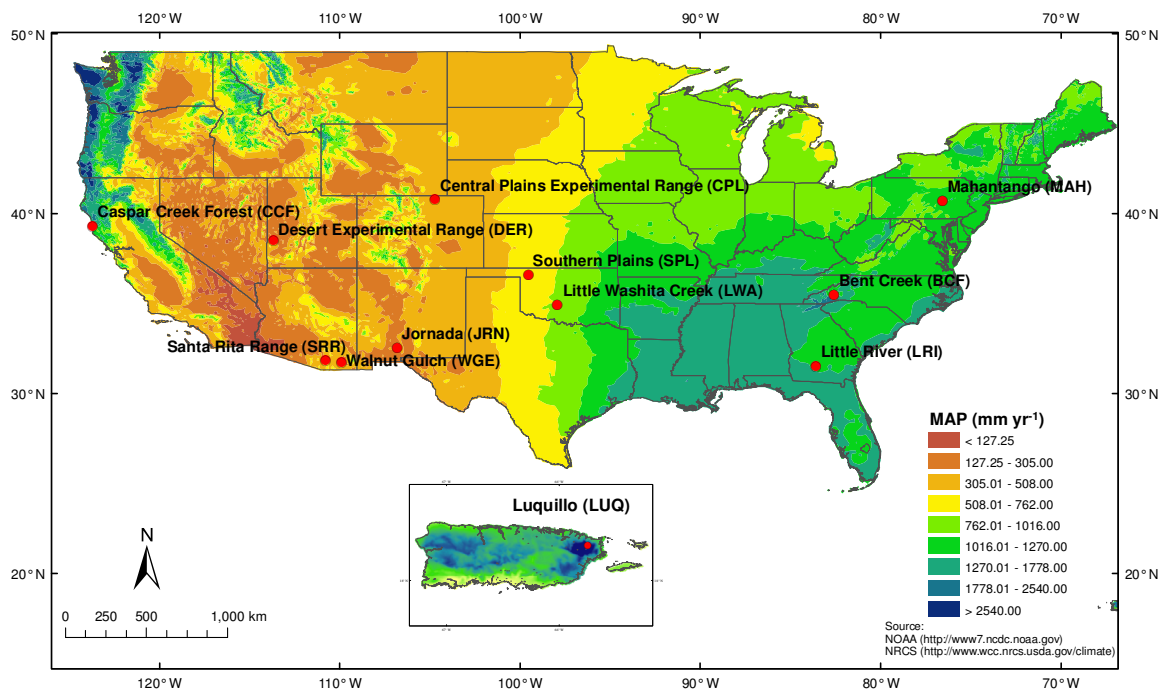


Figure 1. Location of the USDA₀₀₋₀₉ experimental sites with mean annual precipitation (MAP).

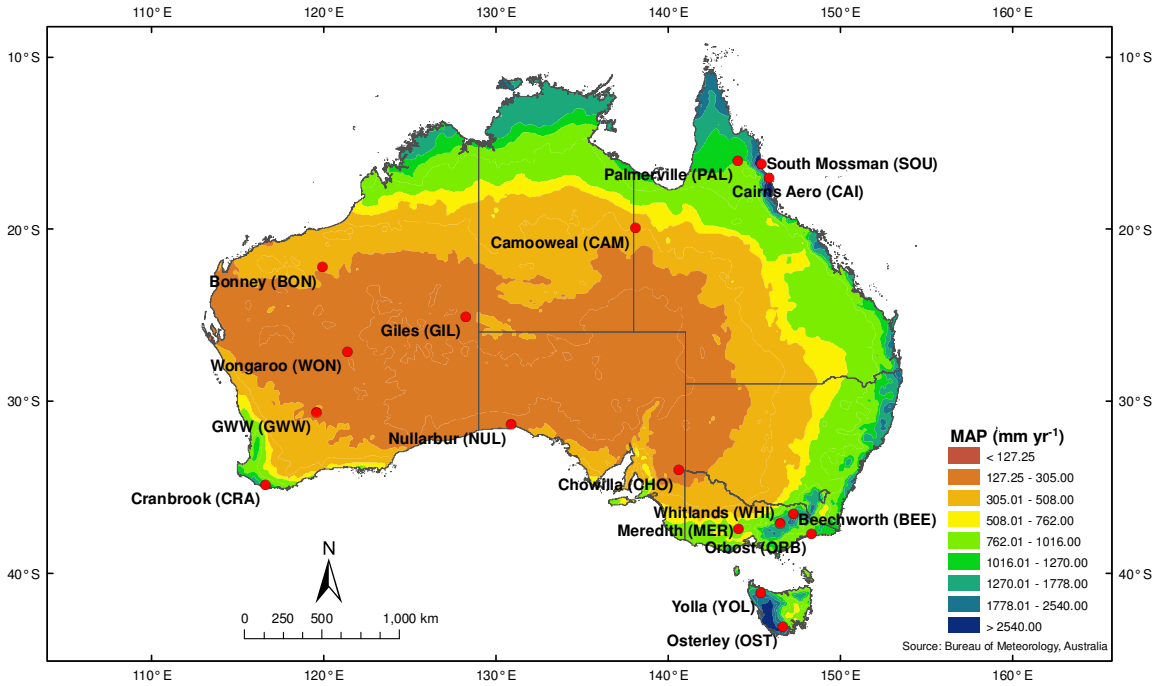


Figure 2. Location of the Australia₀₁₋₀₉ experimental sites with mean annual precipitation (MAP).

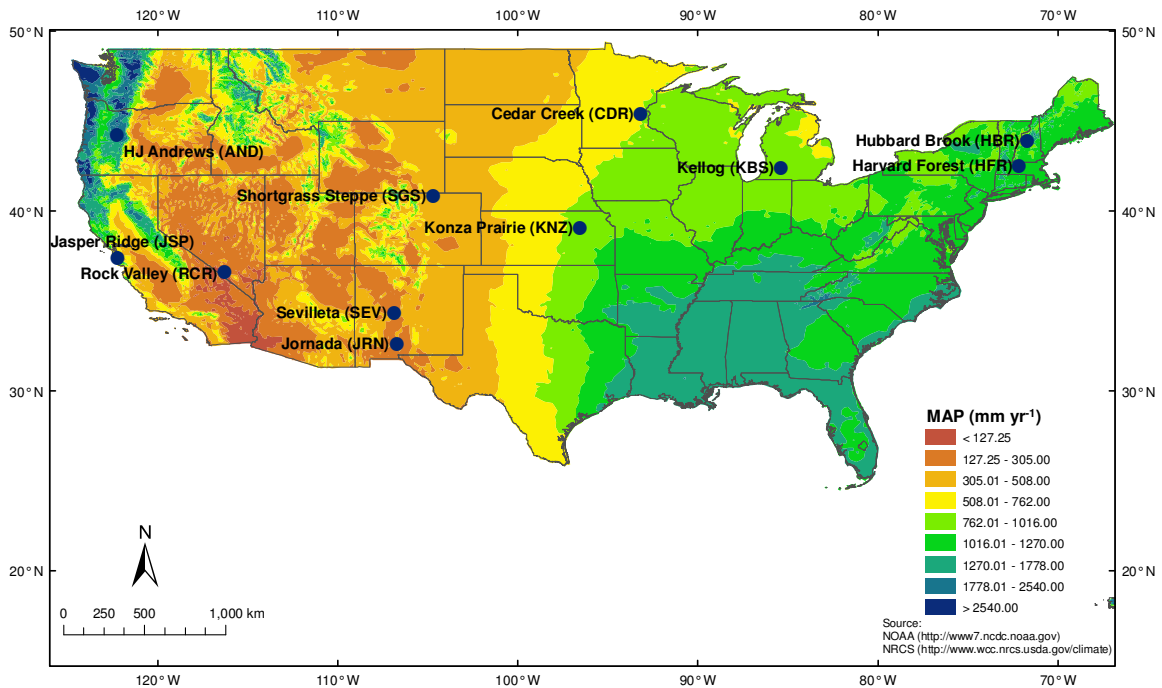


Figure 3. Location of the LTER₇₅₋₉₈ experimental sites with mean annual precipitation (MAP). Sites not shown in this map of the conterminous United States are Bonanza Creek (BNZ) in Alaska, Patagonia Steppe (PSA) in Argentina, and Barro Colorado Island (BCI) in Republic of Panama.

Table 1. Characteristics of the sites in the LTER₇₅₋₉₈, USDA₀₀₋₀₉, Australia₀₁₋₀₉, and LTER₀₀₋₀₉ datasets, including dominant biome type, site name abbreviation and mean annual precipitation (MAP, mm yr⁻¹) during the study period. Site names and locations are given in Figures 1-3 and by studies using the LTER₇₅₋₉₈ dataset^{2,3}. Sites in the LTER₇₅₋₉₈ dataset used in studies of rain-use efficiency² were designated with “*”, those used in studies of production responses to extreme precipitation pulses³ were designated with “§” and the sites in the LTER network are designated with “+”.

<i>Dominant Biome type</i>	LTER ₇₅₋₉₈		USDA ₀₀₋₀₉		Australia ₀₁₋₀₉		LTER ₀₀₋₀₉	
	<i>Abbr.</i>	<i>MAP (mm yr⁻¹)</i>	<i>Abbr.</i>	<i>MAP (mm yr⁻¹)</i>	<i>Abbr.</i>	<i>MAP (mm yr⁻¹)</i>	<i>Abbr.</i>	<i>MAP (mm yr⁻¹)</i>
Grass	RCR*	106	DER	164	BON	428	JRN	242
	JRN ^{+*§}	263	JRN	260	CAM	442	SGS	330
	SEV ^{+*§}	269	WGE	281			CDR	538
	SGS ^{+*§}	359	CPL	330				
	CDR ^{+*§}	826	SPL	610				
	KNZ ^{+*§}	834	LWA	761				
	JSP*	922						
Shrub	PSA*	162	SRR	327	CHO	211		
	KBS ^{+*§}	866			WON	265		
					NUL	283		
					GIL	320		
					GWV	322		
Forest	BNZ ^{+*§}	343	LRI	967	OST	455		
	HFR ^{+*§}	1196	CCF	1049	MER	591		
	HBR ^{+*§}	1413	MAH	1129	CRA	709		
	AND ^{+*}	2131	BCF	1297	ORB	753		
	BCI*	2543	LUQ	3772	BEE	811		
					PAL	1105		
					WHI	1131		
					YOL	1267		
					CAI	1830		
				SOU	2245			

Table 2. Sites with ANPP field measurements available within the 2000-2009 period.

Site	Biome and Location	Period
Jornada (JRN)	Semiarid Grassland, New Mexico	2000-2008 ^a
Sevilleta (SEV)	Semiarid Grassland, New Mexico	2002-2003 ^a
Shortgrass Steppe (SGS)	Mesic Grassland, Colorado	2000-2009 ^a
Cedar Creek (CDR)	Mesic Grassland, Minnesota	2000-2007 ^a
Konza Prairie (KNZ)	Mesic Grassland, Kansas	2000-2002 ^a
Harvard Forest (HFR)	Mixed Forest, Massachusetts	2000-2006 ^a
Metolius Intermediate Pine	Evergreen Needle-leaf Forest, Oregon	2001 ^b
Park Falls	Deciduous Broad-leaf Forest, Wisconsin	2000, 2004 ^b
Ohio Hills Fire and Fire Surrogate	Mixed Forest, Ohio	2001-2002 ⁴
University of Michigan Biological Station	Deciduous broadleaf forest, Michigan	2000-2006 ⁵

a- <http://www.lternet.edu/site/> **b-** <http://public.ornl.gov/ameriflux/>

Table 3. PDSI annual averages for USDA₀₀₋₀₉ and Australia₀₁₋₀₉ sites during the period 2000-2009, where cells with PDSI < 0 are shaded.

USDA										
Sites	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
DER	-1.75	-1.75	-3.42	-3.21	-2.93	0.48	-0.37	-0.47	-0.09	-0.35
JRN	-0.03	-0.30	-2.08	-2.14	-1.26	1.13	-1.28	4.25	3.02	2.26
WGE	-1.53	-0.43	-1.80	-2.59	-0.28	-0.43	-2.76	0.48	-0.60	-0.46
SRR	-1.23	0.77	-2.94	-2.82	-3.32	-3.19	-3.65	-3.04	-1.66	-2.26
CPL	-1.22	-1.04	-2.18	-2.84	-3.54	-2.60	-2.53	-2.71	-1.86	1.45
SPL	1.56	-0.12	-1.69	0.02	0.85	1.98	-1.38	0.53	-0.33	-0.39
LWA	-3.17	-2.47	-3.22	-3.29	-3.64	-3.12	-3.24	1.43	2.29	1.31
LRI	-1.63	-0.47	-2.19	0.91	-0.23	0.94	-2.21	-3.88	-3.32	-2.59
CCF	2.56	-1.48	-1.72	-0.07	-1.44	0.00	1.26	-1.79	-2.26	-3.39
MAF	-1.59	-2.09	-3.65	1.71	2.89	3.33	2.47	2.21	2.29	1.86
BCF	-1.22	-1.34	-1.33	2.29	2.75	2.93	3.35	-0.20	-1.99	-0.15
LUQ	-0.52	-2.63	-2.03	-0.78	0.93	3.69	2.65	-1.16	-0.70	0.19
Australia										
Sites	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
CHO	0.07	-2.13	-1.78	-0.17	-2.07	-0.38	-1.89	-2.85	-3.51	-2.63
WON	3.93	3.01	-0.33	-0.36	0.38	-0.27	1.82	-1.40	-2.57	-3.37
NUL	-1.81	1.08	-1.00	-0.62	-0.55	0.02	-0.03	-1.87	-3.48	-2.79
GIL	3.22	3.84	-1.89	0.58	-0.41	1.42	0.12	-1.45	-2.22	-2.10
GWV	3.13	-1.29	-1.77	1.26	1.27	1.18	-1.15	-2.89	-1.97	-2.99
BON	4.36	2.52	-0.97	-2.08	-2.65	0.35	2.41	-1.47	0.21	-0.56
CAM	2.48	-2.88	-3.68	-3.48	-2.97	-0.80	-0.27	-1.70	-0.58	2.46
OST	-2.22	0.50	-1.39	-0.28	-1.40	-0.56	-1.95	-3.05	-3.64	1.99
MER	0.08	0.44	-1.31	-0.82	0.64	-1.03	-2.88	-3.06	-3.77	-2.38
CRA	-2.23	-3.63	-3.71	-2.96	NA	-2.29	-2.55	-2.85	-3.14	-2.45
ORB	-0.55	0.48	-1.82	-3.36	-3.88	-2.84	-3.29	-2.96	-3.42	-3.60
BEE	2.58	0.80	-2.03	-2.08	-0.69	-0.11	-3.20	-3.86	-2.97	-3.20
PAL	-0.35	-0.16	-0.78	-1.99	-1.46	-2.03	3.30	4.06	3.84	2.27
WHI	2.90	0.98	-1.72	-0.03	0.69	0.87	-3.02	-3.14	-3.09	-2.78
YOL	-0.98	-1.50	-1.49	0.52	-0.54	0.52	-2.88	-3.65	-3.61	-3.77
CAI	0.82	-1.35	-2.87	-3.02	-3.78	-2.32	0.82	-0.24	-1.52	-2.74
SOU	2.14	-1.13	-1.52	-1.99	-3.12	-4.27	-2.58	-2.15	-3.23	-4.02

References

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