Supplementary Information for

Leaf water content contributes to global leaf trait relationships

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Supplementary Table 1. Results of bootstrap nonlinear regression analysis by fitting the model to global leaf trait data.

Parameter	Estimate	S.E.	Low 95%CI	High 95%CI
Photosynthesis (Equation 2)				
$\ln(g_1)$	-2.25	5.40	-13.22	8.59
k_1	2.35	0.55	1.54	3.59
K_1	0.94	1.49	0.25	2.65
E	-0.13	0.14	-0.40	0.15
SLA (Equation 5)				
$\ln(g_2)$	4.79	0.36	4.07	5.48
k_1	2.53	0.07	2.40	2.68
K_1	1.52	0.16	1.23	1.86
E	0.03	0.01	0.01	0.05

Note: g_1 and g_2, intercepts; k_1, the maximum increase in $\ln(P_s)$ and $\ln(SLA)$ due to changes in leaf water content; K_1, leaf water content when the mean reaction rate of cellular metabolism reaches one-half of its maximum; E, activation energy.

Supplementary Table 2. Summary of leaf area-mass scaling relationships for the different plant groups.

| Plant group	n	Temperature & LWC correction	Intercept	Exponent	95%CI	r^2
Growth form						
Graminoid	491	No	5.36	1.07	1.04-1.10	0.92
	491	Yes	5.04	1.05	1.03-1.07	0.93
Forb	1688	No	5.33	1.02	1.00-1.03	0.93
	1688	Yes	4.80	1.01	0.99-1.02	0.94
Shrub	1097	No	5.24	1.10	1.08-1.11	0.95
	1097	Yes	4.95	1.05	1.04-1.06	0.96
Tree	832	No	4.73	0.95	0.93-0.98	0.86
	832	Yes	4.54	0.94	0.92-0.96	0.91
Ecosystem						
Desert	97	No	5.07	1.04	1.00-1.08	0.97
	97	Yes	4.88	1.02	0.99-1.06	0.97
Grassland	1285	No	5.16	0.99	0.98-1.01	0.93
	1285	Yes	4.74	0.99	0.98-1.00	0.95
Forest	1367	No	4.91	0.91	0.90-0.93	0.87
	1367	Yes	4.68	0.93	0.92-0.95	0.92
Tundra	1271	No	5.29	1.09	1.07-1.11	0.89
	1271	Yes	4.68	1.01	0.99-1.02	0.92
Wetland	114	No	4.60	1.03	0.98-1.09	0.92
	114	Yes	4.49	1.02	0.98-1.07	0.95
Latitudinal zone						
Tropical	1111	No	4.99	0.94	0.92-0.95	0.91
	1111	Yes	4.65	0.98	0.96-0.99	0.94
Temperate	2113	No	5.05	1.00	0.99-1.01	0.91
	2113	Yes	4.81	1.01	1.00-1.02	0.94
Boreal	910	No	5.35	1.10	1.08-1.12	0.91
	910	Yes	4.91	1.04	1.02-1.05	0.95
All	4134	No	5.12	1.02	1.02-1.03	0.92
	4134	Yes	4.77	1.01	1.00-1.01	0.95

Supplementary Fig. 1. The scaling of temperature-corrected whole-leaf photosynthesis (P_L, nmol s^{-1}) with leaf area (A_L, cm^2).
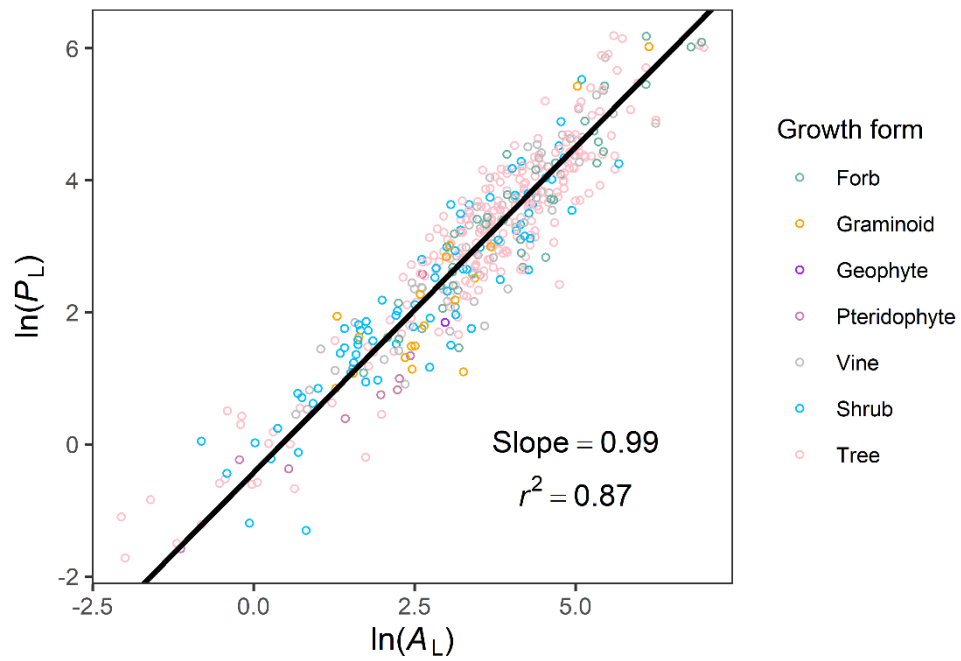
Supplementary Fig. 2. The scaling of leaf water content with leaf mass (M_L, g) across the pooled data.
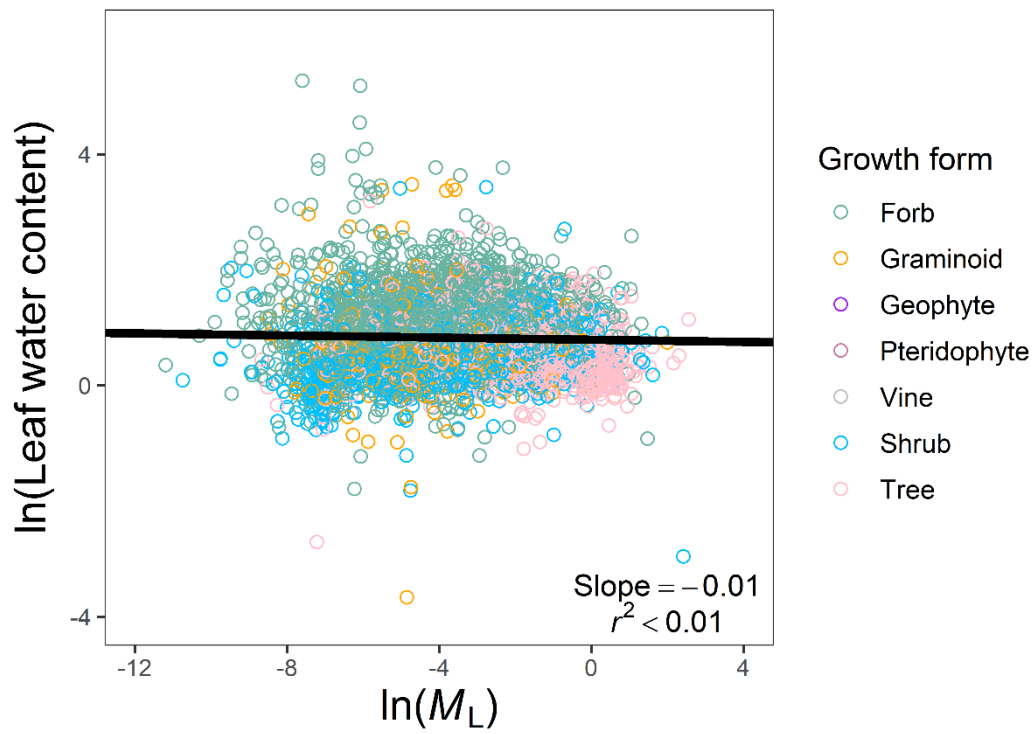
Supplementary Fig. 3. The effect of leaf water content on the rate of change in temperature-corrected leaf photosynthetic rate $P_\mathrm{L}e^{E/kT}$ (**a**) and leaf area $A_\mathrm{L}e^{E/kT}$ (**b**) with respect to differences in M_L. The numerical values of parameters k_1 and K_1 used to quantify the dynamics of $P_\mathrm{L}e^{E/kT}$ and $A_\mathrm{L}e^{E/kT}$ were obtained from the non-linear fitting results of Eqs. 2 and 5, respectively.
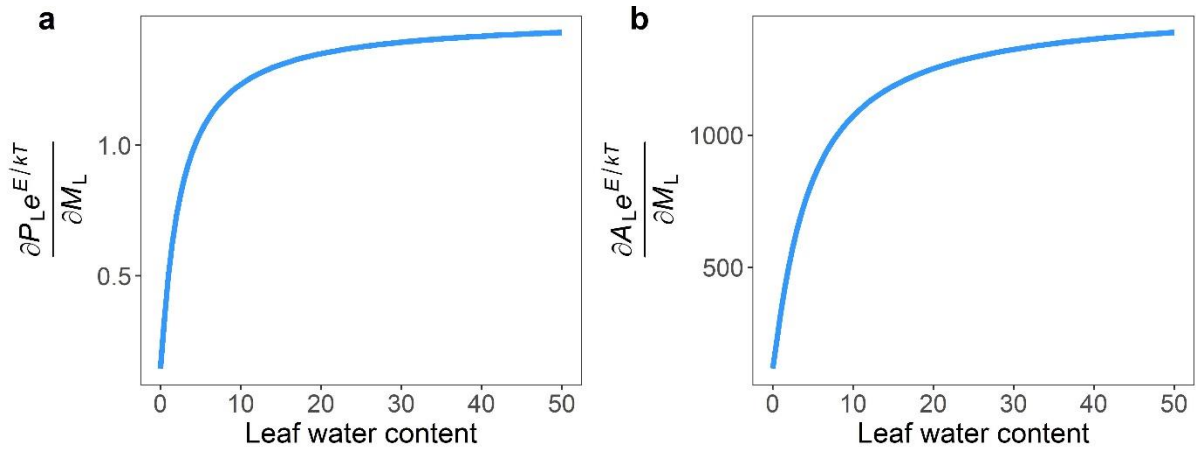
Supplementary Fig. 4. The scaling of LWC (**a**) and temperature-corrected SLA (**b**) with mean annual precipitation (MAP, mm) across the pooled data. LOWESS curves (blue lines) and 95% confidence intervals are shown.
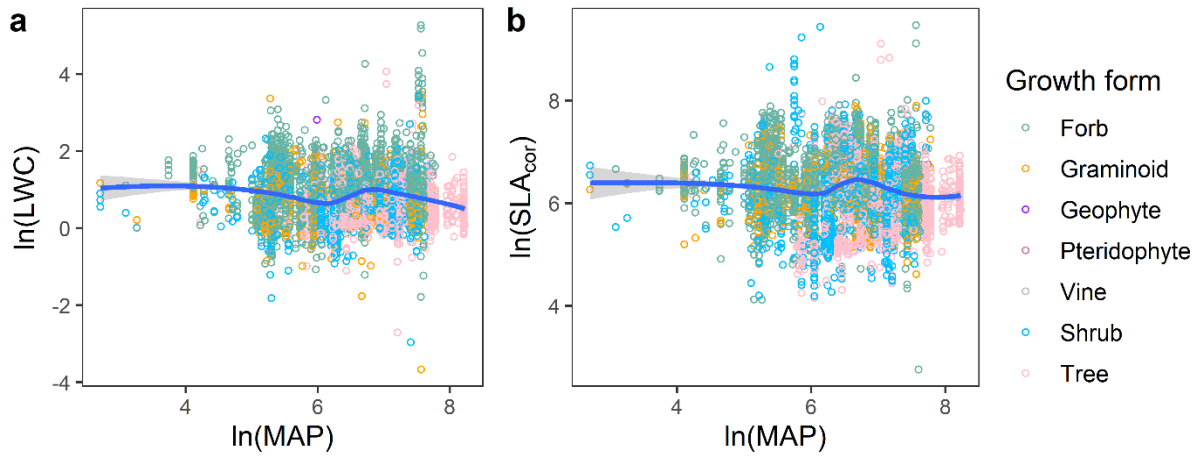
Data Sources

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