



Supplement of

Isotopic offsets between bulk plant water and its sources are larger in cool and wet environments

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SUPPLEMENTARY INFORMATION

Table S1. Results (*t* and *P*), sample size (*n*) and parameter estimates according to the linear mixed models (including the null models without any predictor variables) to assess the effects of temperature, soil volumetric water content (VWC), potential evapotranspiration (PET), wood density and parenchyma fraction on the slope of the soil water line (SWL slope), line-conditioned excess (LC-excess) and soil water excess (SW-excess). All parameter estimates have been standardized.

Response Variable	Predictor variable	n	Estimate	Std. error	t-value	P-value	
SWL slope	Null model	656	5.52	0.17	31.687	<0.001	
	Monthly air temperature	609	-0.32	0.07	-4.58	<0.001	
	Mean anual air temperature	639	0.034	0.164	0.209	0.835	
	Monthly precipitation	609	0.45	0.10	4.44	<0.001	
	Annual precipitation	639	0.40	0.15	2.51	0.013	
	Monthly VWC (0-7 cm)	609	0.90	0.10	8.99	<0.001	
	Monthly VWC (7-28 cm)	609	0.80	0.09	8.45	<0.001	
	Monthly VWC (28-100 cm)	609	0.60	0.10	5.54	<0.001	
	Monthly VWC (100-289 cm)	609	0.23	0.13	1.76	0.078	
	Monthly soil water content (0-100 cm)	609	0.72	0.10	6.77	<0.001	
	Monthly soil water content (0-289 cm)	609	0.52	0.13	3.99	<0.001	
	Annual VWC (0-7 cm)	639	0.34	0.13	2.48	0.014	
	Annual VWC (7-28 cm)	639	0.32	0.13	2.41	0.016	
	Annual VWC (28-100 cm)	639	0.27	0.13	2.19	0.034	
	Annual VWC (100-289 cm)	639	0.25	0.13	1.90	0.058	
	Annual soil water content (0-100 cm)	639	0.30	0.13	2.27	0.024	
	Annual soil water content (0-289 cm)	639	0.28	0.13	2.12	0.034	
	Monthly PET	572	-0.33	0.077	-6.75	<0.001	
	Annual PET	639	-0.52	0.014	-2.32	0.021	
	LC-excess	Null model	642	-12.230	1.32	-9.02	<0.001
		Monthly air temperature	602	-0.12	0.45	-0.33	0.742

	Mean anual air temperature	632	-1.04	1.36	-0.76	0.448
	Monthly precipitation	602	0.36	0.63	0.57	0.565
	Annual precipitation	632	1.49	1.18	1.26	0.206
	Monthly VWC (0-7 cm)	602	0.53	0.65	0.85	0.411
	Monthly VWC (7-28 cm)	602	0.67	0.61	1.09	0.272
	Monthly VWC (28-100 cm)	602	0.70	0.72	0.98	0.328
	Monthly VWC (100-289 cm)	602	0.89	0.86	1.03	0.304
	Monthly soil water content (0-100 cm)	602	0.74	0.71	1.05	0.249
	Monthly soil water content (0-289 cm)	602	1.00	0.87	1.16	0.247
	Annual VWC (0-7 cm)	632	1.60	1.06	1.15	0.133
	Annual VWC (7-28 cm)	632	1.56	0.96	1.62	0.106
	Annual VWC (28-100 cm)	632	0.63	0.91	0.62	0.489
	Annual VWC (100-289 cm)	632	0.88	0.86	1.03	0.304
	Annual soil water content (0-100 cm)	632	0.89	0.93	0.95	0.341
	Annual soil water content (0-289 cm)	632	0.92	0.89	1.03	0.303
	Monthly PET	602	-0.12	0.45	-0.33	0.742
	Annual PET	632	-2.52	1.00	-2.50	0.013
	Wood density	251	-2.02	1.33	-1.15	0.138
	Parenchyma fraction	148	-0.16	1.88	-0.08	0.933
	Null model	656	-3.02	0.65	-4.59	<0.001
SW-excess	Monthly air temperature	609	1.00	0.32	3.06	0.002
	Mean anual air temperature	639	0.03	0.16	0.21	0.835
	Monthly precipitation	609	-0.74	0.45	-1.62	0.103
	Annual precipitation	639	-0.21	0.78	-0.25	0.784
	Monthly VWC (0-7 cm)	609	-1.94	0.44	-4.32	<0.001
	Monthly VWC (7-28 cm)	609	-1.61	0.42	-3.80	<0.001
	Monthly VWC (28-100 cm)	609	-1.51	0.48	-3.14	0.002
	Monthly VWC (100-289 cm)	609	-0.72	0.54	-1.33	0.185
	Monthly soil water content (0-100 cm)	609	-1.69	0.47	-3.55	<0.001
	Monthly soil water content (0-289 cm)	609	-1.25	0.54	-2.29	0.022
	Annual VWC (0-7 cm)	639	-1.22	0.69	-1.75	0.081
	Annual VWC (7-28 cm)	639	-0.94	0.64	-1.48	0.141
	Annual VWC (28-100 cm)	639	-1.07	0.61	-1.76	0.079

Annual VWC (100-289 cm)	639	-0.75	0.58	-1.28	0.198
Annual soil water content (0-100 cm)	639	-1.07	0.62	-1.73	0.086
Annual soil water content (0-289 cm)	639	-0.87	0.60	-1.45	0.148
Monthly PET	609	1.00	0.33	3.02	0.002
Annual PET	639	-0.12	0.65	-0.18	0.850
Wood density	258	0.82	0.91	0.90	0.268
Parenchyma fraction	150	-0.11	1.43	-0.07	0.938

Table S2 Sample size (*n*) and results (*F* and *P*) for the linear mixed models assessing differences in the slope of the soil water line (SWL slope), line conditioned excess (LC-excess) and soil water excess (SW-excess) among quantitative variables: soil classes (coarse, medium, medium fine, fine, ,very fine, organic or tropical organic), type of methodology used for measuring soil or stem water (mass or laser spectrometer), taxonomic group (angiosperms or gymnosperms), leaf habit (evergreen, deciduous or semi-deciduous), leaf shape (narrow or broad), growth form (tree, shrub or non-woody) and known type of mycorrhizal habit (non-mycorrhizal, arbuscular, ectomycorrhizal or arbuscular and ectomycorrhizal). Differences within group indicated were assessed with post-hoc tests for those variables with significant ($P < 0.05$) effects.

Response Variable	Predictor variable	n	F-value	P-value	Within group differences
SWL slope	Soil class	636	0.66	0.618	
	Methodology (soil)	656	0.97	0.327	
LC-excess	Soil class	629	2.80	0.028	Organic soils > Medium textured soils ($P = 0.0218$)
	Soil isotopic measurement	642	0.67	0.414	
	Xylem isotopic measurement	642	0.35	0.421	
	Taxonomic group	570	0.87	0.354	
	Leaf habit	552	0.01	0.363	
	Leaf shape	473	0.04	0.831	
	Growth form	622	3.00	0.052	
	Mycorrhizal habit	406	3.29	0.014	Non-mycorrhizal > Ectomycorrhizal ($P = 0.016$) Non-mycorrhizal > Arbuscular ($P = 0.018$)
SW-excess	Soil class	636	1.93	0.109	
	Methodology (soil)	656	6.17	0.015	Mass > Laser ($P = 0.015$)
	Methodology (stem)	656	3.80	0.054	Mass > Laser ($P = 0.048$)
	Taxonomic group	570	0.11	0.733	
	Leaf habit	552	0.45	0.633	
	Leaf shape	473	0.43	0.514	
	Growth form	622	2.86	0.057	
	Mycorrhizal habit	408	0.63	0.635	

Table S3. Output of the models for the soil water excess (SW-excess) residuals and environmental variables. The response variable (SW-excess residuals) is obtained after running the correlation between SW-excess and the slope of the soil water line (SWL) and the intercept of the SWL. For each model, the estimates, 95% confidence interval (CI) and *P*-value are shown. Numbers in bold highlight significant effects ($P < 0.05$).

Predictor	Intercept residuals			Slope residuals		
	Estimate	CI	<i>P</i> -value	Estimate	CI	<i>P</i> -value
Monthly soil water (0-100 cm)	< 0.01	-0.01-0.00	0.344	< 0.01	<0.01-<0.01	0.683
Monthly air temperature	0.09	0.03-0.15	0.002	0.06	0.01-0.12	0.023

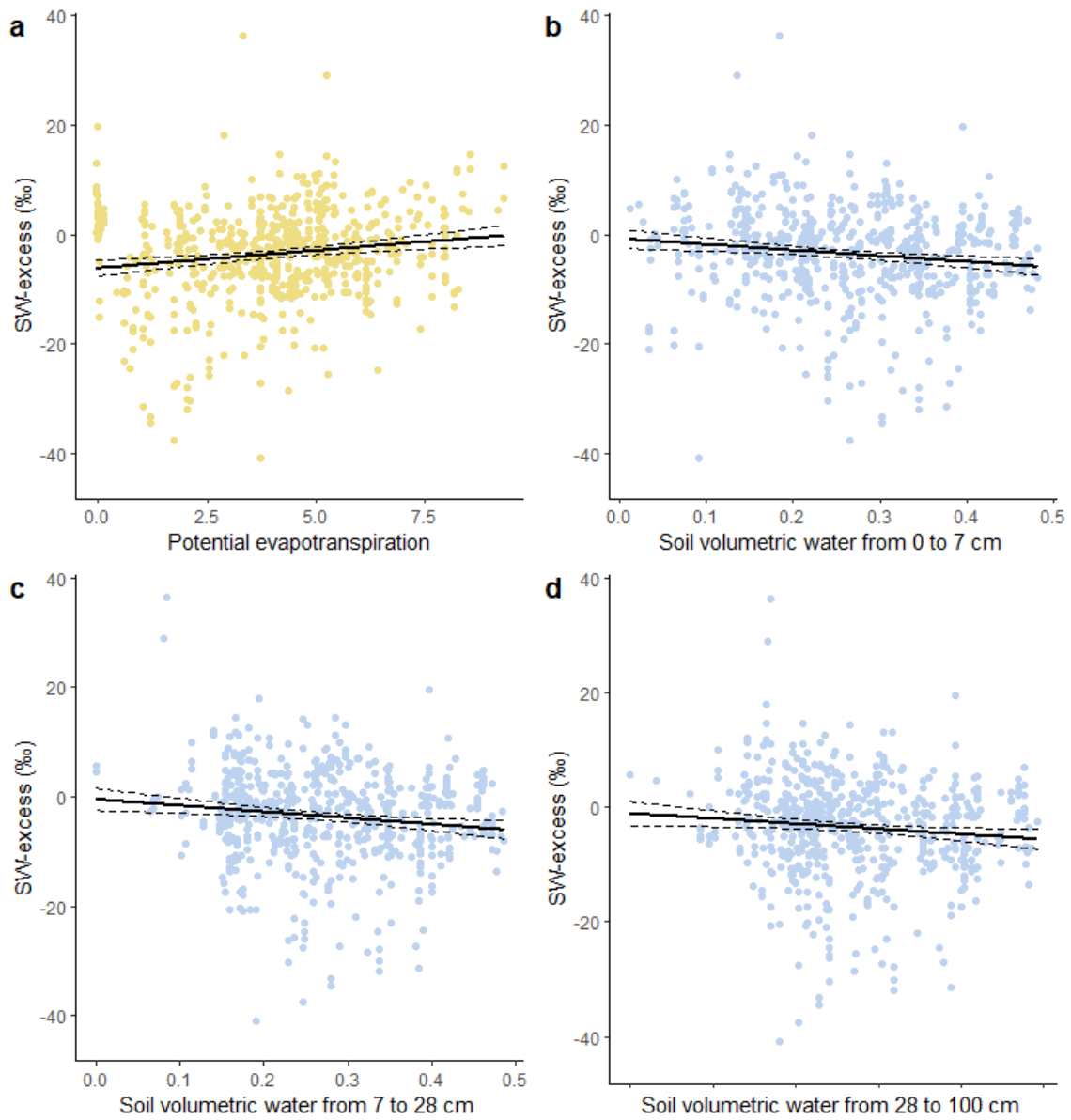


Figure S1. Significant correlations between soil water excess (SW-excess) and potential evapotranspiration (a, PET), and monthly soil volumetric water content (b-d, VWC) estimated for different depths (shallow, 0 to 7 cm in a; intermediate 7 to 28 in b and deep, 28 to 100 cm in d). Each point is the mean SW-excess per species and campaign (observations from a given sampling event and plot/site within a study). The solid and dashed lines are the prediction and standard error of the corresponding linear mixed model, with a single predictor variable.