Supplement

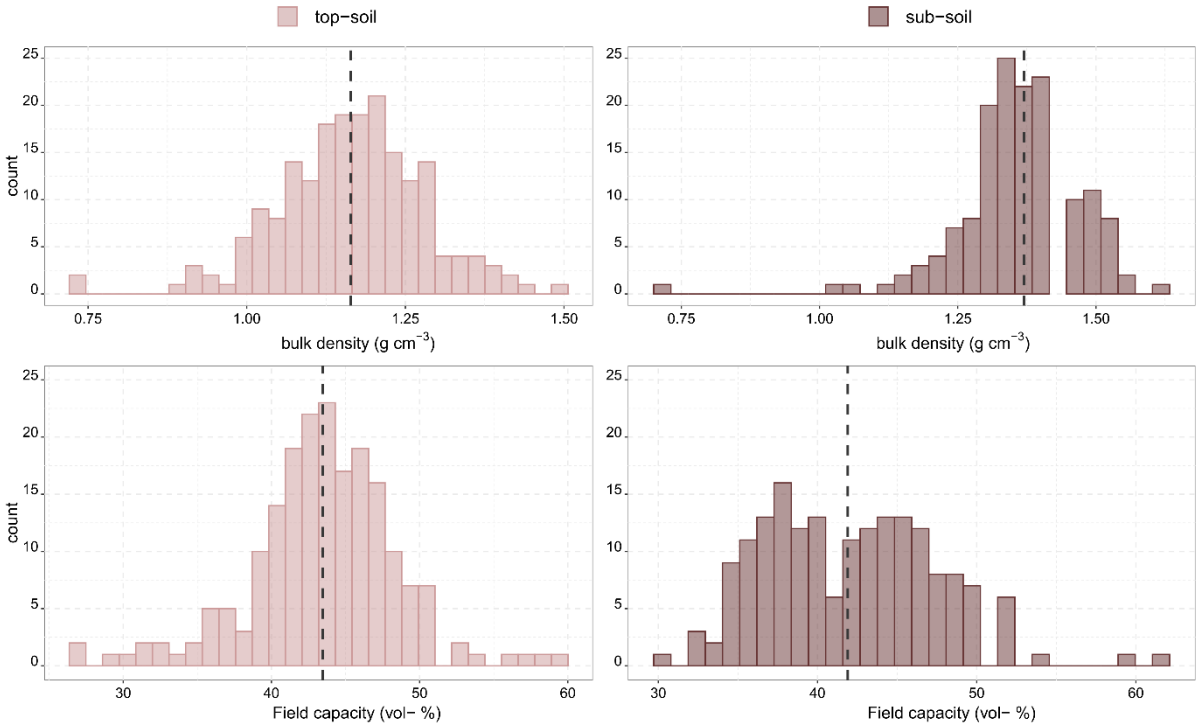

Figure S1 Histogram of the soil bulk density and volumetric water content at field capacity in the research site.

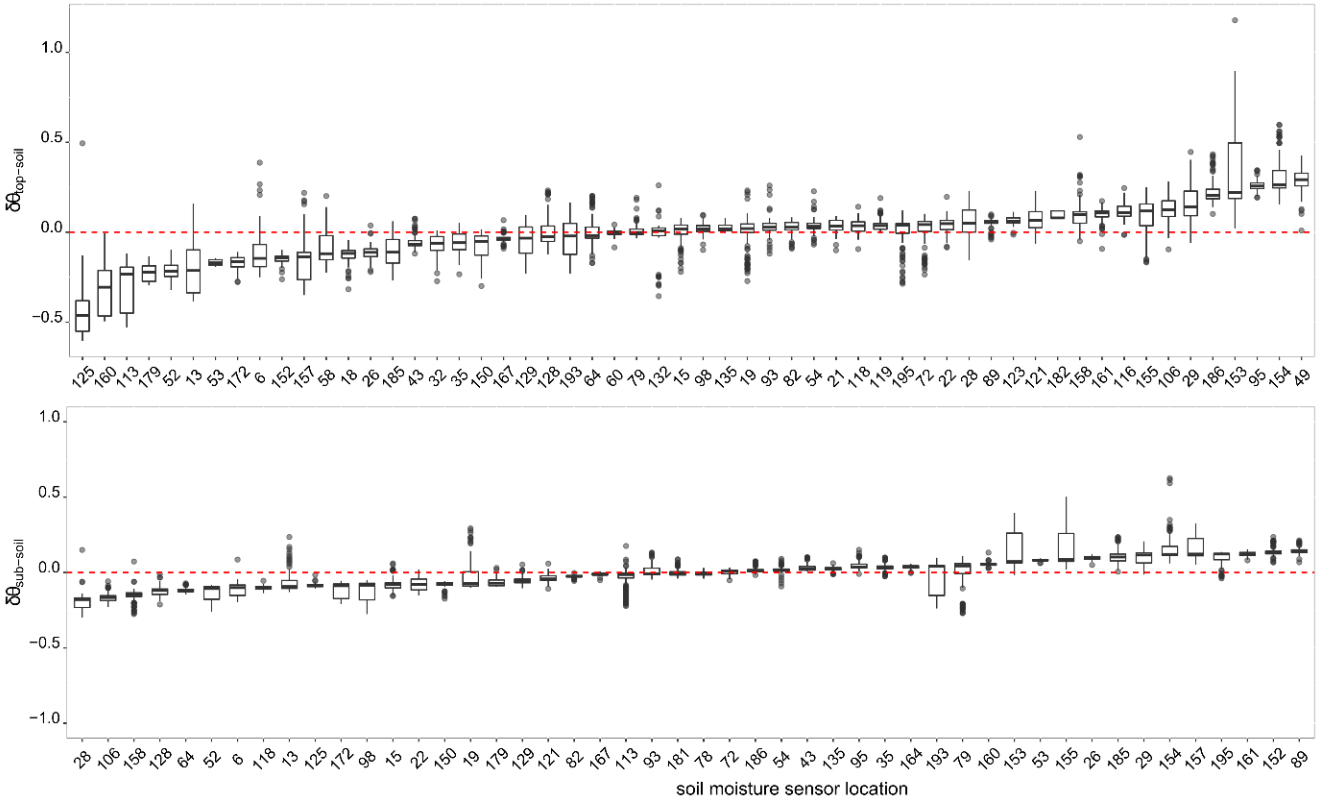

Figure S2 Temporal stability of soil water content at top and subsoil based on the spatial deviation of the measurements recorded at all sensor locations throughout the sampling period (April-August 2019)

Supplement

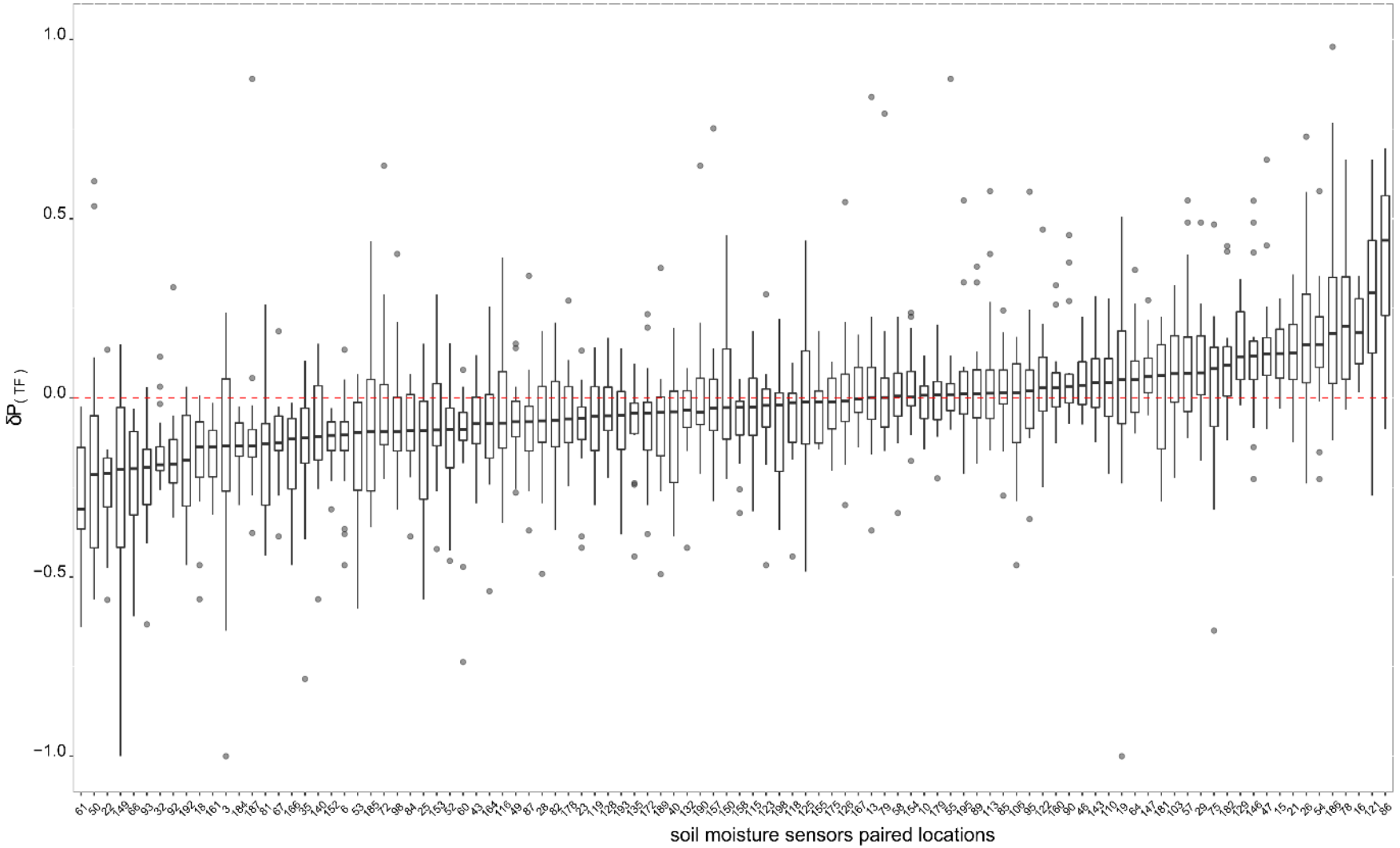

Figure S3 Temporal stability of throughfall patterns based on the spatial deviation of the paired throughfall collectors' measurements in 2019 (April-August).

Supplement

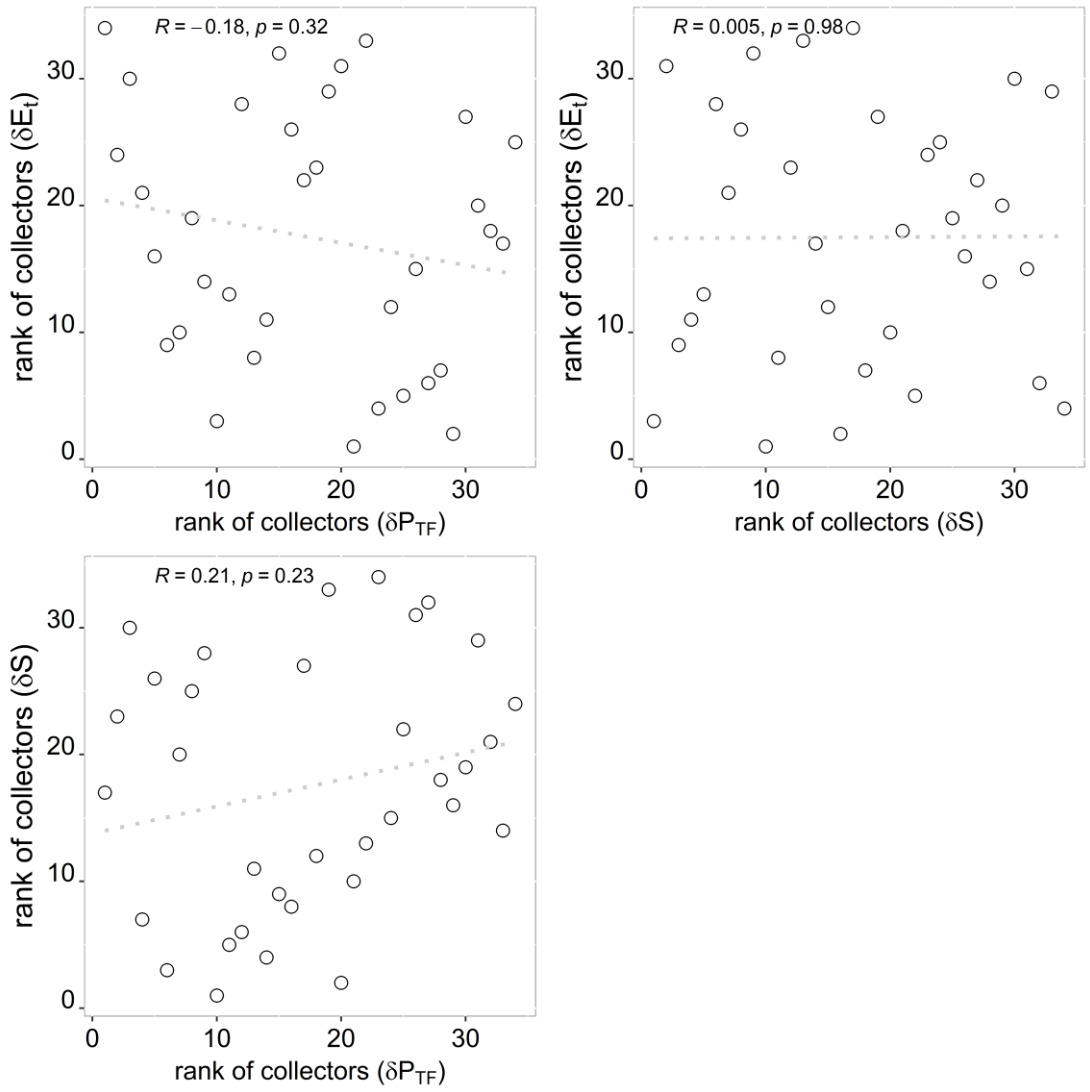

Figure S4 The Pearson correlation plots of the patterns: (left-above) root water uptake-throughfall, (right above) root water uptake-soil water, and (left below) soil water-throughfall patterns. The correlation coefficient is shown with 'R' together with the level of significance (*p*).

Supplement

Table S1 The summary of the optimal model. Signif. codes: ≈0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 '▪'1

Fixed Factors (single)	Estimate	p- value	t-value
Spatial average of soil water storage in the monitored soil layer ($\bar{S}$)	0.11	0.32	-1.032
Spatial deviation of soil water storage from the mean (δS)	0.44	0.000158***	3.880
Field capacity of the monitored soil layer (S_{FC})	- 0.12	0.505984	-0.675
The median of spatial deviation of throughfall measured within the whole sampling period ($\widetilde{\delta P_{TF}}$)	0.25	0.072182▪	-1.887
Inverse distanced basal area (BA)	- 0.03	0.876059	-0.158
Number of species ($n_{sp,tree}$)	0.02	0.927599	0.092
Fixed Factors in an interaction			
$\delta S \times S_{FC}$	- 0.35	0.000916***	-3.420
$\bar{S} \times BA$	0.15	0.004420**	2.888
$n_{sp,tree} \times BA$	1.05	0.000444***	4.254

Random factors		
	Variance	**Std.Dev**
Soil moisture sensor location	0.54	0.73
Dry period	0.09	0.31
Residual	0.37	0.61
REML criterion at convergence	415.8	
AIC	441.8043	

Table S2: Correlation of Fixed Effects of the optimal model

Fixed factors								
$\bar{S}$	-0.2							
δS	0.084	-0.237						
S_{FC}	-0.023	0.016	-0.227					
$\widetilde{\delta P_{TF}}$	-0.093	0.057	-0.185	0.047				
BA	0.069	-0.034	0.045	0.059	-0.023			
$n_{sp,tree}$	0.017	0.032	-0.238	0.110	0.120	0.291		
$\delta S \times S_{FC}$	-0.083	-0.073	0.195	-0.384	-0.047	-0.017	0.043	
$\bar{S} \times BA$	0.042	-0.194	0.171	-0.010	-0.073	0.047	-0.043	0.083
$n_{sp,tree} \times BA$	0.251	-0.102	0.167	-0.135	-0.001	0.229	0.368	-0.105