Supplementary material
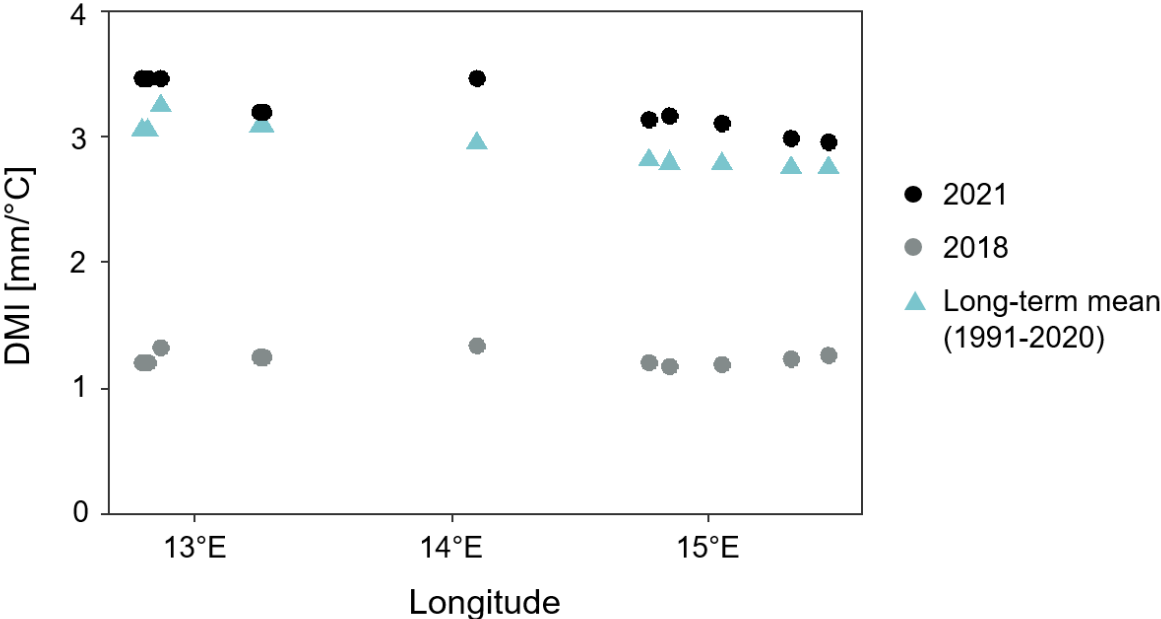
Fig. S1. The average DMI (De Martonne Aridity Index) during the summer months (May-July) for the 13 fields, and the long-term mean between 1991 and 2020 for the locations of the same fields.
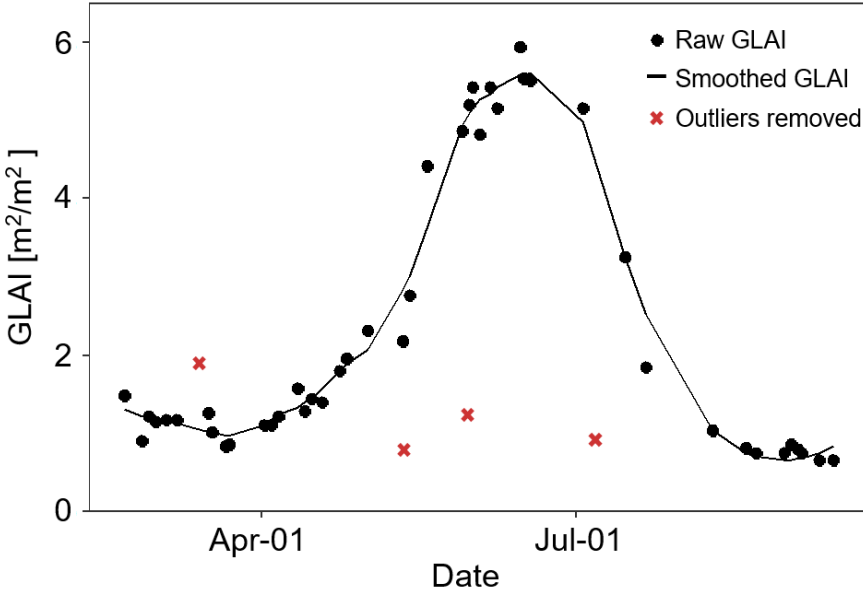
Fig. S2. Example of the temporal development of the green leaf area index (GLAI) with smoothed GLAI (black line), raw GLAI values (black dots), and removed outliers (red crosses).
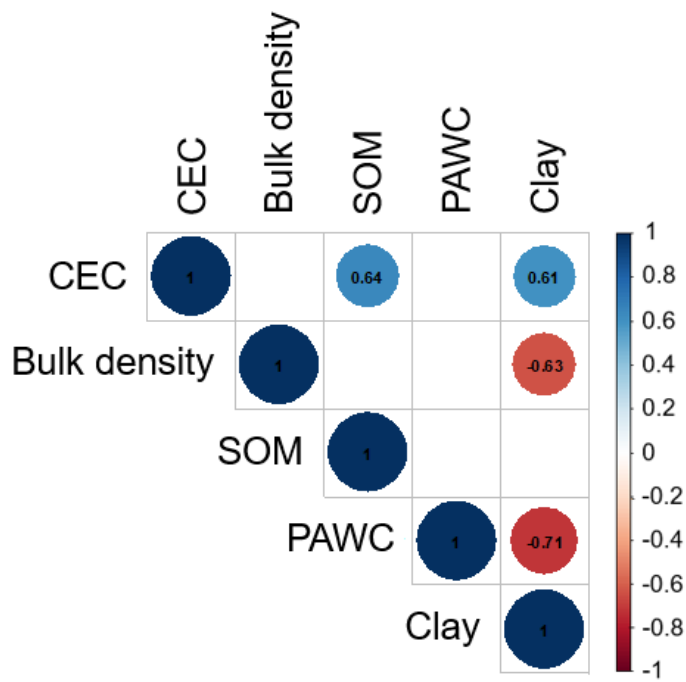
Fig. S3. Spearman correlation coefficients between the soil properties CEC (cation exchange capacity), clay content, SOM (soil organic matter content), plant available water capacity (PAWC) and bulk density. Red colour indicates a negative and blue colour a positive correlation coefficient.

Tab. S1. Ranges and distributions for combinations of leaf (PROSPECT-D) and canopy (4SAIL) parameters according to a uniform or Gaussian distribution. Mean and standard deviation are indicated in brackets.

Trait	Description	Unit	Range
PROSPECT-D (Leaf)			
N	Leaf Structure Parameter	$[-]$	1–2.5 (1.5, 0.2)
Cab	Leaf Chlorophyll a+b Content	$[\mu g\ cm^{-2}]$	redistributed based on GLAI
Car	Leaf Carotenoid Content	$[\mu g\ cm^{-2}]$	redistributed based on Cab
Cant	Leaf Anthocyanin Content	$[\mu g\ cm^{-2}]$	0.0–5.0 (2.0, 0.8)
Cbrown	Brown Pigments	$[-]$	0–1
Cw	Equivalent Water Thickness	[cm]	0–0.07 (0.04, 0.02)
Dm	Dry Matter Content	$[g\ cm^{-2}]$	0–0.01
4SAIL (Canopy)			
GLAI	Green Leaf Area Index	$[m^2\ m^{-2}]$	0–8
ALA	Leaf Inclination Angle	[deg]	30–70
hspot	Hot spot Parameter	$[-]$	0.01–0.5
rsoil	Soil Brightness Factor	$[-]$	0–1
psoil	Dry/Wet Soil Factor	$[-]$	0–1

Table S1. Minimum, maximum, and mean values of the measured soil properties across all fields. CEC: cation exchange capacity, clay: clay content, SOM: soil organic matter content, PAWC: plant available water capacity, and bulk density.

	Minimum	Maximum	Mean
CEC [cmol kg^{-1}]	10.3	28.6	16.3
Clay [%]	10.5	58.5	31.3
SOM [%]	2.3	5.7	3.6
PAWC [%]	19.4	26.2	23.0
Bulk density [g cm^{-3}]	1.3	1.7	1.5