

**Table S1.** Overview of the study 37 sites. AWC and tree measurements represent mean values from the sample containing 15 (-20) single values (see column N, sample size). Abbreviations and legends see below.

Site ID	Species <sup>[1]</sup>	FER <sup>[2]</sup>	CMI <sup>[3]</sup>	Texture <sup>[4]</sup>	MR <sup>[5]</sup>	NZ <sup>[6]</sup>	NR <sup>[7]</sup>	N	AWC [L m <sup>-2</sup> ]	(mean ± sd)		
										Tree age [year]	Tree height [m]	DBH <sup>[8]</sup> [cm]
1109	Aalba	H2	0.89	Ls3	mf	1_O	Ba	15	116 ± 18	130 ± 4.8	36 ± 2.4	66 ± 10.9
1212	Aalba	H3	0.51	Ls4	mf	2_I	Ba	15	95 ± 26	81 ± 7.5	32 ± 3.1	49 ± 9.6
1107	Aalba	H2	0.50	Ls4	md-f	3_M	Ba	15	82 ± 21	130 ± 5.8	36 ± 3.2	67 ± 10.9
1108	Aalba	H3	0.55	Sl3	md	4_R	Ba	15	36 ± 28	77 ± 7.8	25 ± 1.5	47 ± 4.6
1201	Aalba	B2	0.95	Ls2	mf	1_O	Br	20	68 ± 17	79 ± 21.9	30 ± 2.8	40 ± 7.0
1306	Aalba	H2	0.62	Lu	mf	2_I	Br	15	83 ± 28	129 ± 7.7	34 ± 2.2	57 ± 8.1
1110	Aalba	D2	0.62	Tl	mf	3_M	Br	15	52 ± 26	124 ± 3.4	37 ± 2.6	62 ± 10.1
1111	Aalba	D2	0.69	Lt3	md	4_R	Br	15	10 ± 8	102 ± 4.9	31 ± 1.4	49 ± 4.5
1202	Aalba	B2	1.00	Ls2	w	1_O	Mb	20	69 ± 44	114 ± 24.4	37 ± 2.6	57 ± 9.4
1103	Aalba	D2	0.55	Lu	f	2_I	Mb	15	121 ± 10	108 ± 7.5	34 ± 2.8	51 ± 8.1
1105	Aalba	D2	0.37	Ut4	f	3_M	Mb	15	156 ± 16	93 ± 5.6	35 ± 1.6	54 ± 6.2
1104	Aalba	D2	0.37	Lu	md	4_R	Mb	15	113 ± 14	105 ± 3.8	34 ± 2.5	53 ± 7.8
2405	Fsylv	H1	0.85	Sl3	mf-f	1_O	Ba	15	38 ± 43	160 ± 9.1	38 ± 2.7	60 ± 7.3
2106	Fsylv	H3	0.94	Sl3	mf	2_I	Ba	15	95 ± 37	116 ± 6.2	33 ± 1.7	50 ± 6.2
2411	Fsylv	C3	0.27	Ss	mf	3_M	Ba	15	54 ± 12	79 ± 2.6	21 ± 1.7	30 ± 4.5
2410	Fsylv	C3	0.27	Ss	mf-md	4_R	Ba	15	57 ± 10	80 ± 0.0	18 ± 2.2	27 ± 4.3
2201	Fsylv	D3	0.99	Lt3	w	1_O	Br	15	98 ± 10	106 ± 3.0	31 ± 4.4	37 ± 6.7
2202	Fsylv	D2	0.67	Tu3	mf	2_I	Br	15	135 ± 31	100 ± 4.2	32 ± 2.5	43 ± 4.9
2209	Fsylv	D2	0.33	Tu3	mf	3_M	Br	15	90 ± 27	107 ± 3.2	33 ± 2.6	40 ± 6.8
2108	Fsylv	D2	0.44	Tu3	md	4_R	Br	15	24 ± 6	83 ± 7.5	23 ± 1.1	33 ± 4.0
2204	Fsylv	E2	0.84	Ut4	vf	1_O	Mb	15	146 ± 13	126 ± 4.2	37 ± 2.1	55 ± 5.8
2313	Fsylv	H1	0.96	Ut3	mf	1_O	Mb	15	114 ± 46	131 ± 7.9	28 ± 3.0	40 ± 4.8
2412	Fsylv	D1	0.52	Sl3	mf	2_I	Mb	15	91 ± 24	164 ± 6.7	37 ± 2.7	60 ± 6.3
2103	Fsylv	D2	0.20	Ut4	mf	3_M	Mb	15	152 ± 23	118 ± 4.2	37 ± 2.6	60 ± 5.0
2107	Fsylv	D2	0.38	Sl3	md	4_R	Mb	15	121 ± 17	113 ± 5.2	33 ± 2.5	50 ± 6.4
3409	Pabie	H3	0.87	Ls3	mf	1_O	Ba	15	79 ± 15	103 ± 32.7	34 ± 3.4	51 ± 8.5
3204	Pabie	H3	0.65	Sl4	mf	2_I	Ba	15	114 ± 30	91 ± 9.5	34 ± 3.1	45 ± 5.3
3212	Pabie	H2	0.06	Sl2	mf	3_M	Ba	15	87 ± 43	85 ± 8.7	34 ± 3.0	47 ± 5.2
3211	Pabie	H2	0.05	Sl2	mf-md	4_R	Ba	15	113 ± 27	95 ± 7.7	35 ± 2.6	46 ± 4.4
3108	Pabie	G	0.78	Tu3	mf	1_O	Br	15	22 ± 11	90 ± 3.5	32 ± 2.5	50 ± 7.2
3107	Pabie	G	0.67	Tu3	mf	2_I	Br	15	50 ± 29	92 ± 17.5	34 ± 2.5	47 ± 6.9

3202	Pabie	G	0.15	Lt3	mf	3_M	Br	15	88 ± 15	109 ± 6.1	38 ± 2.2	54 ± 6.8
3203	Pabie	G	0.15	Tl	md	4_R	Br	15	19 ± 6	68 ± 6.2	21 ± 2.3	31 ± 6.7
3201	Pabie	B2	0.83	Ls2	w	1_O	Mb	15	105 ± 17	92 ± 6.5	33 ± 2.2	49 ± 7.2
3410	Pabie	H3	0.44	Ls3	mf	2_I	Mb	15	106 ± 14	128 ± 3.7	37 ± 1.8	52 ± 7.6
3306	Pabie	H2	0.23	Sl2	mf-md	3_M	Mb	15	105 ± 30	95 ± 1.3	33 ± 1.3	38 ± 3.6
3305	Pabie	H2	0.46	Sl3	md-d	4_R	Mb	15	76 ± 21	111 ± 7.5	30 ± 2.0	38 ± 7.3

<sup>[1]</sup> Species: Aalba: *Abies alba*, Fsyly: *Fagus sylvatica*, Pabie: *Picea abies*.

<sup>[2]</sup> FER: Forest ecological regions, see below (Kolb & Göttlein, 2014):

FER	Forest ecological landscapes	Forest ecological regions
B2	carbonate-rich moraines and foreland sands	South German young moraine and foothills of the Alps
C3	low-carbonate moraines, outwash sands and drift sands	North German shallow old moraine and outwash plains
D1	loess dominated landscapes	Central and eastern German loess landscapes
D2	loess dominated landscapes	limestone and marl landscapes, often loess-covered
D3	loess dominated landscapes	southern German tertiary hill country with old moraines and gravel plates, partly loess-covered
E2	large river valleys and adjacent lowlands	large river valleys and adjacent lowlands - high mountain drainage regime
G	Alb	Swabian-Franconian Alb
H1	nutrient-poor sediments of solid rock and acid crystalline rock	central German paleozoic sediments
H2	nutrient-poor bedrock sediments and acid crystalline rocks	south- and middle-German mesozoic sediments
H3	nutrient-poor sediments of solid rock and acid crystalline rock	south-, middle- and east-German acid crystalline

<sup>[3]</sup> CMI: climatic marginality index.

<sup>[4]</sup> Texture: German texture classes (KA5, AG Boden, 2005): Ls2: slightly sandy loam, Ls3: medium sandy loam, Ls4: highly sandy loam, Lt3: medium clayey loam, Lu: silty loam, Sl2: slightly loamy sand, Sl3: medium loamy sand, Sl4: highly loamy sand, Ss: pure sand, Tl: loamy clay, Tu3: medium silty clay, Ut3: medium clayey silt, Ut4: highly clayey silt.

<sup>[5]</sup> MR: Soil moisture regime: w: wet, vf: very fresh, f: fresh, moderately fresh: mf, moderately dry: md, d: dry.

<sup>[6]</sup> NZ: niche zone: 1\_O: optimal, 2\_I: intermediate, 3\_M: marginal, 4\_R: rear edge.

<sup>[7]</sup> NR: nutrient regime: Ba: acidic/poor, Mb: medium, Br: rich.

<sup>[8]</sup> DBH: diameter at breast height.