Supplement of:
Radial growth of *Picea abies* is controlled by joint effects of temperature and nutrient availability at the lower part of treeline ecotone
Hana Kuželová, Tomáš Chuman, Jelena Lange, Jan Tumajer, Václav Treml

Table S1: Basic characteristics of sampled trees (mean ± standard deviation). Differences in tree age between north-facing (N) and south-facing (S) sites were significant only in 2013 ($p<0.05$).

Year	Site	Age	DBH	Height
2012	N	130±26	38±6	11.8±1.4
	S	119±31	33±3	12.1±1.5
2013	N	147±19	41±5	Not determined
	S	94±12	33±5	Not determined
2014	N	104±40	41±4	9.1±1.1
	S	120±7	31±3	8.5±0.5

Table S2: Mean values of soil parameters on the north- and south-facing slope based on five soil samples. Variables: exchangeable pH (CaCl2), cation exchange capacity (CEC), total soil N, soil organic carbon (Cox), and plant-available concentrations of Ca2+, Mg2+, K+ and P with Mehlich III extraction solution. The analytical results for Ca that were below detection limit were replaced by 4/5 of the detection limit to calculate the Ca mean value.

Variable	Unit	South	North
pH (CaCl2)		3.1	3.0
CEC	mmol+/100g	42.1	72.5
Cox	%	11.9	17.6
Ca	mg/kg	93.4	135.0
K	mg/kg	148.2	179.8
Mg	mg/kg	35.8	60.4
P	mg/kg	15.6	23.7
N	%	0.9	1.2
C/N	ratio	14.8	15.3
N/K	ratio	58.4	73.8

Figure S1: Soil water potential at the north- (blue) and south-facing (orange) site over the period 2012-2014. X-axis denotes days of the years.
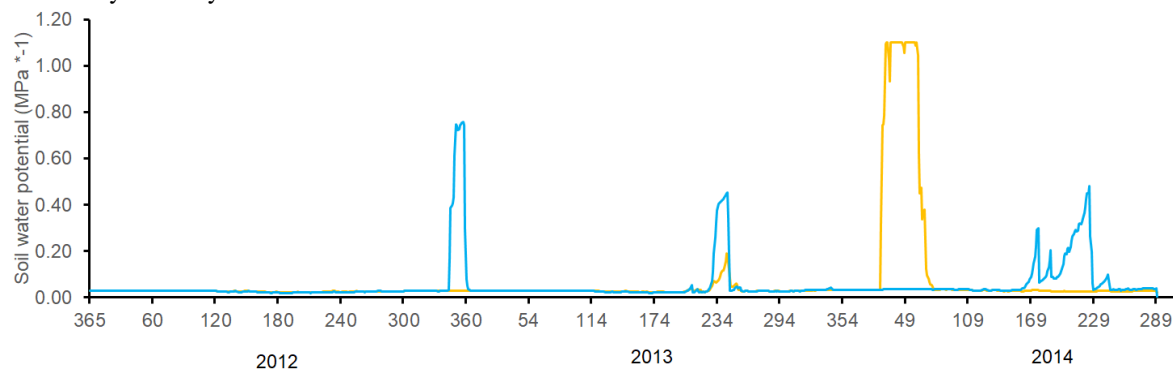
Figure S2: Comparison of the number of produced tracheids during the growing season between the north-facing (blue) and the south-facing (orange) slope.
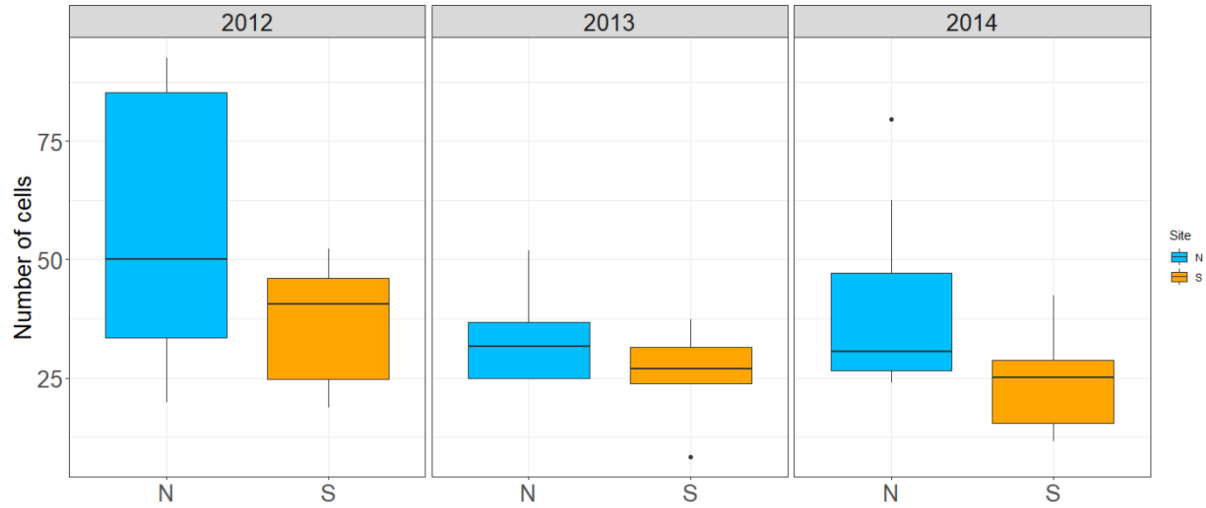
Figure S3: Boxplots show critical dates and rates of wood formation for the north- (blue) and south- (orange) facing slope separately for 2012-2014 (in rows): Beginning and End of cell formation denote 5% and 95% of cells formed, respectively. Peak date refers to the date of the peak cell formation rate. Maximum and mean cell formation rates are abbreviated as Maximum rate and Mean rate, respectively. The asterisk indicates statistically significant difference according to the Kruskal-Wallis test (p<0.05).
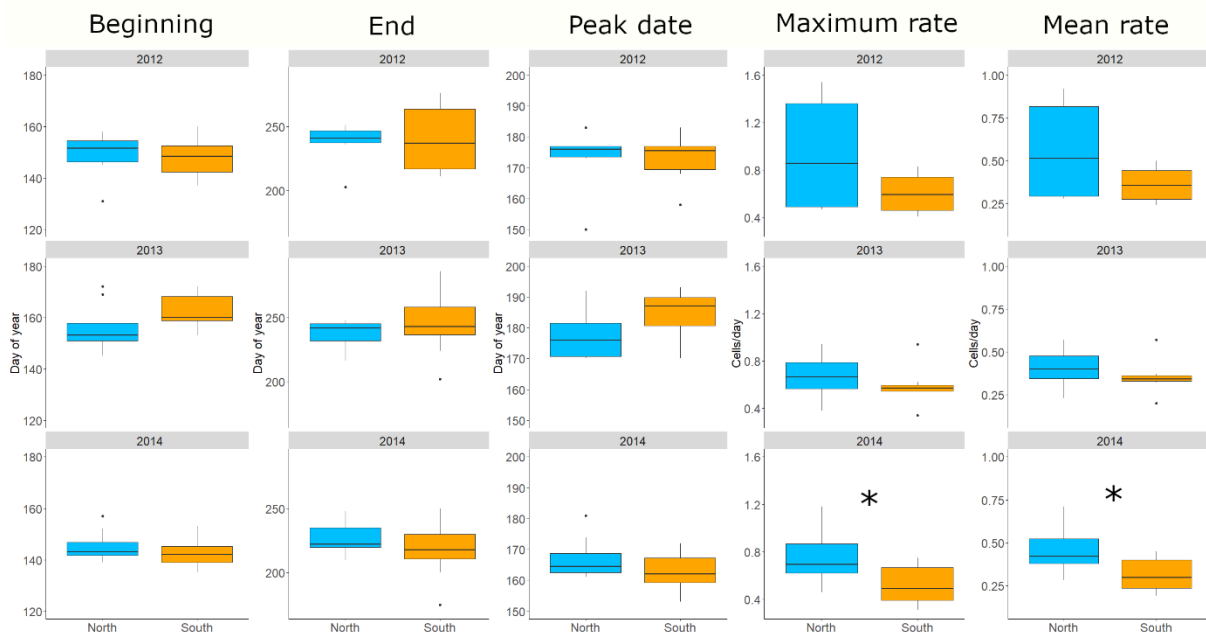
Figure S4: Relationship between mean tree basal area increment (mm^2) and tree age for trees growing on the north-facing site (blue) and the south-facing site (orange).
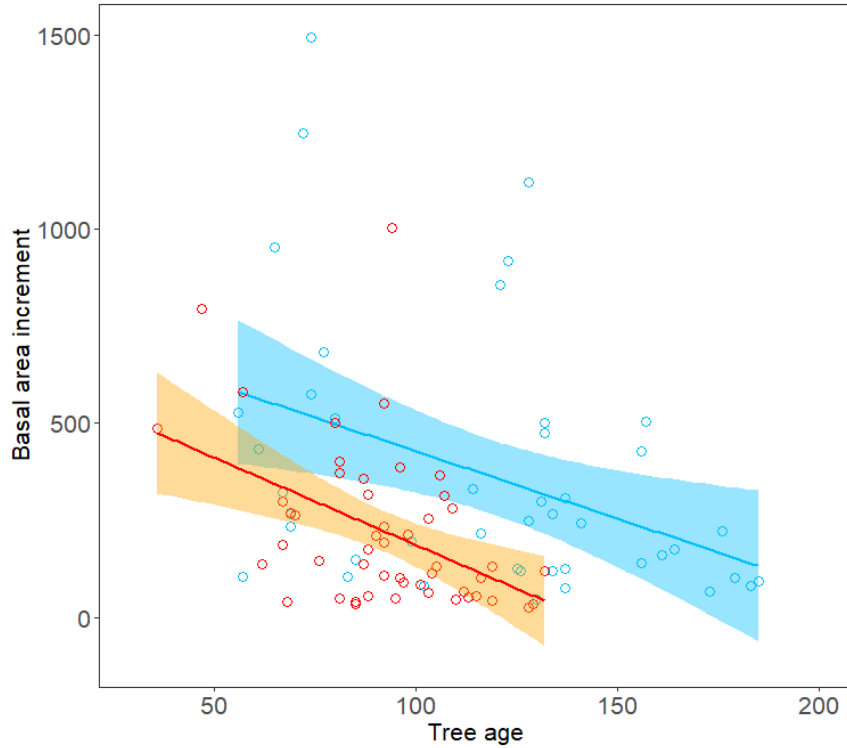
Figure S5: Comparison of timing (top) and duration (bottom) of main phases of tracheid differentiation between the north- (blue) and south-facing slope (orange). The x-axis in the upper panel and the y-axis on the lower panel denote the day of the year. Abbreviations: E: enlarging cells, WT: wall-thickening cells, X: xylogenesis (period between first enlarging cells and day when all cells were mature).
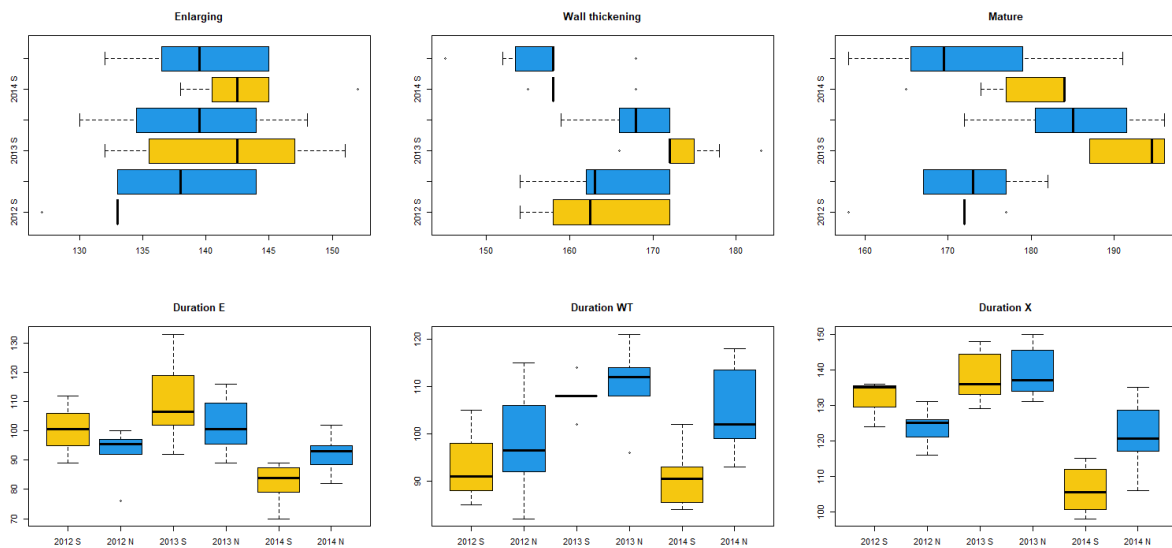
Figure S6: Probabilistic plots of growth activity indicated by active cambial division (CZ.active) or presence of first enlarging cells (EN.active) based on air (dark color) or soil (light color) temperature. North-facing site is shown in blue/light blue, south-facing site in red/orange color. Empty/filled circles denote measured air and soil temperature, respectively. The black horizontal line denotes the 50% probability of growth activity.
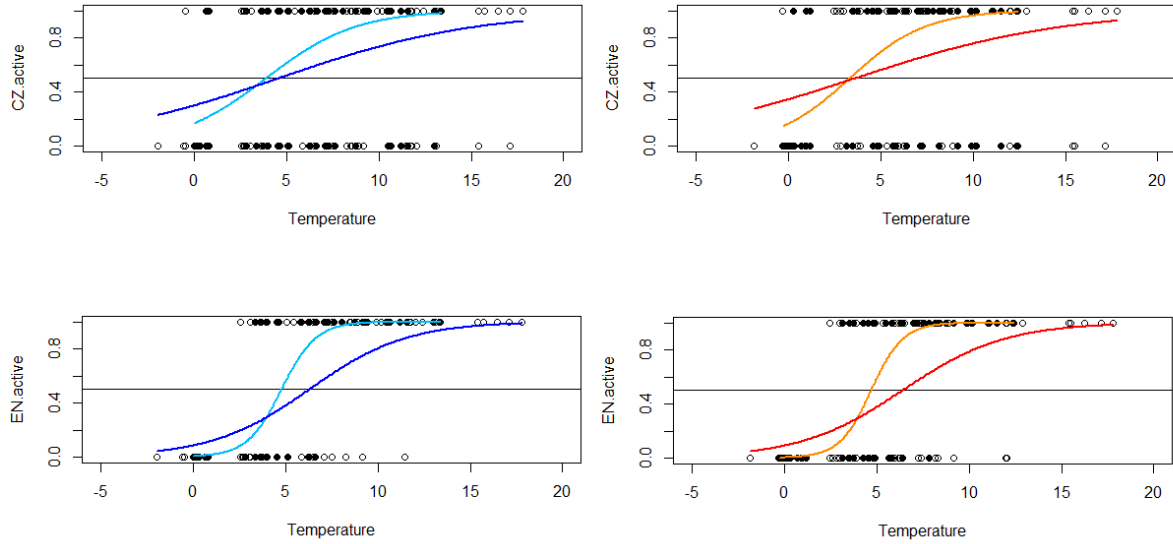
Figure S7: Tree-ring index chronologies for the south- (red) and north-facing (blue) site. Note that due to the standardisation method, the high-frequency part of the growth variability is mainly preserved.