SUPPLEMENTARY DATA

FIG. S1. Relationship between vapour pressure deficit (VPD) and air temperature (T_{air}) inside the assimilation chamber of a Li-6400 gas-exchange system during measurement of the temperature response curve of photosynthesis. Individual measured values of *Fagus sylvatica* and *Picea abies* grown at ambient (AC) and elevated (EC) atmospheric CO_2 concentrations are shown.

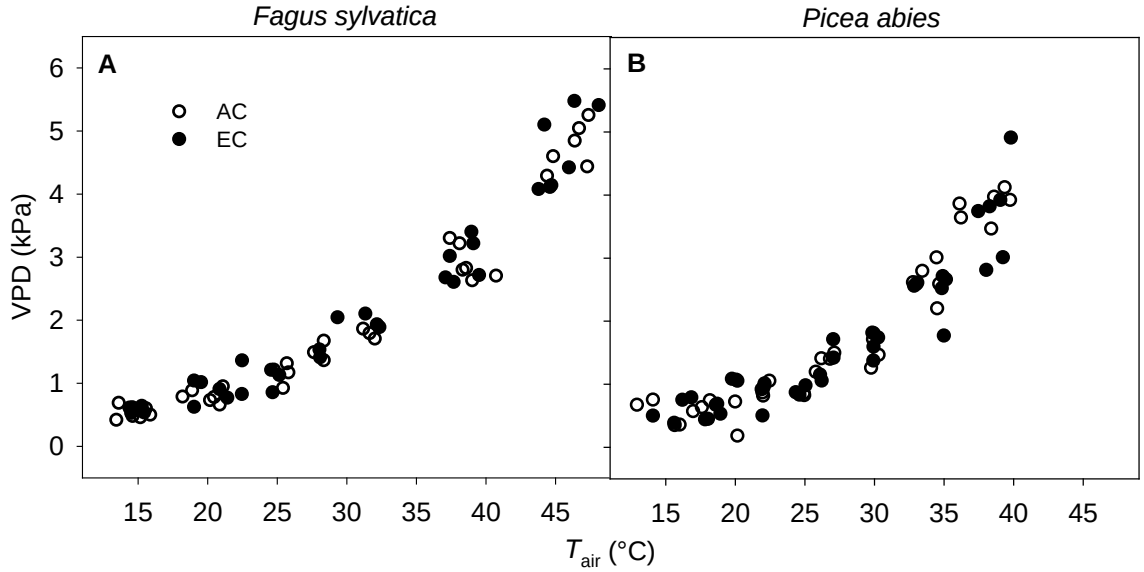

FIG. S2. Temperature response curves of dark mitochondrial respiration (R_D) in *Fagus sylvatica* (left) and *Picea abies* (right) grown under ambient (AC) and elevated (EC) atmospheric CO_2 concentrations. Values of R_D were measured after 15 min of dark adaptation at a given temperature using a Li-6400 open infra-red gas analyser (Li-Cor, USA). Exponential Arrhenius functions were fitted to the R_D data: $R_D(T) = R_D(20)*Q_{10}\exp((T–T20)/10)$, where $R_D(T)$ represents the rate of respiration (μmol m^{-2} s^{-1}) at the given leaf temperature T (°C), $R_D(20)$ is the rate at reference temperature 20°C and Q_{10} is the factor by which the rate constant increases for a 10°C temperature increment. R^2 ranged from 0.92 to 0.94 ($p < 0.01$). Differences in the $R_D(20)$ and Q_{10} parameters between species and CO_2 treatments were not statistically significant ($p > 0.05$) and ranged between 0.71 and 0.93 ($R_D(20)$) and 2.03 and 2.20 (Q_{10}).

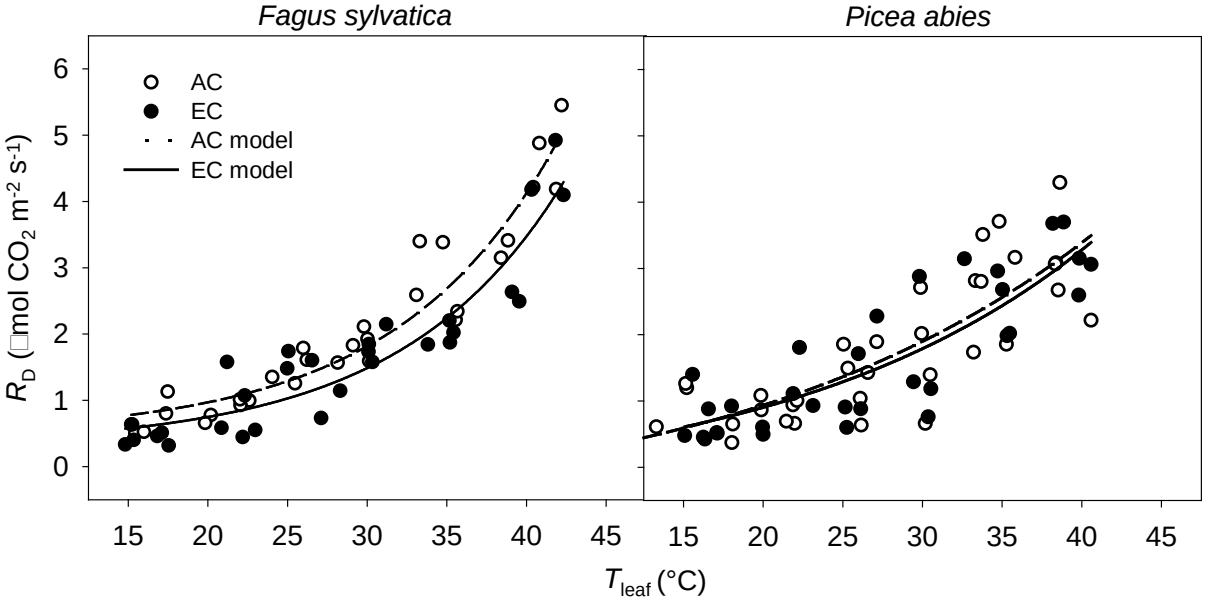

TABLE S1. Comparison of daily air temperature (T_{air}) and relative humidity (RH) statistics between glass domes with ambient (AC) and elevated (EC) CO_2 concentrations for the 7 days preceding individual measurement periods. Mean, minimum and maximum values of selected characteristics are presented for the periods 6–12 July 2010, 13–19 July 2010 and 15–21 August 2011, corresponding to periods prior to measurement campaigns for *Fagus sylvatica*, *Picea abies*, and both species, respectively (see Material and methods). Sums of precipitation for these periods were 38.8, 13.4, and 42.8 mm, respectively.

	T_{air} AC [°C]		T_{air} EC [°C]		RH AC [%]		RH EC [%]	
6–12 July 2010	20.4	7.9 31.2	20.9	8.4 32.4	63.0	28.6 99.8	63.3	28.8 100.0
13–19 July 2010	22.8	11.9 35.1	23.2	12.3 34.9	69.5	33.3 99.7	69.8	33.5 100.0
15–21 August 2011	19.4	11.3 26.7	20.1	11.1 27.7	72.9	38.1 98.7	69.1	31.2 98.7

TABLE S2. Parameters (mean values ± standard deviations) of temperature response curves of light-saturated rate of Rubisco carboxylation (V_{Cmax}) and light-saturated rate of photorespiration (R_L) calculated for individual leaves of *Fagus sylvatica* and *Picea abies* grown at ambient (AC) and elevated (EC) CO_2 concentrations. The modified Arrhenius function (Equation 2) was fitted to the V_{Cmax} and R_L data. $V_{Cmax,25}$ and $R_{L,25}$ are V_{Cmax} and R_L rates at reference leaf temperature 25 °C; $T_{opt}(V_{Cmax})$ and $T_{opt}(R_L)$ are temperature optima of V_{Cmax} and R_L; ΔHa is the activation energy; ΔHd is the deactivation energy of the given parameter; ΔS is the entropy. * and ** indicate statistically significant difference between AC and EC treatments at $p < 0.05$ and 0.01, respectively.

		F. sylvatica		*P. abies*	
		AC	EC	AC	EC
$V_{Cmax,25}$	µmol m^{-2} s^{-1}	39.3 ± 5.8	34.4 ± 4.3	26.5 ± 2.2	23.1 ± 4.2
ΔH_a	kJ mol^{-1}	67.0 ± 10.5	63.7 ± 5.7	80.6 ± 40.0	70.1 ± 29.7
ΔH_d	kJ mol^{-1}	337 ± 85	734 ± 297*	308 ± 160	483 ± 403
ΔS	kJ mol^{-1}	1.08 ± 0.27	2.32 ± 0.93*	1.00 ± 0.51	1.55 ± 1.28
$T_{opt}(V_{Cmax})$	°C	36.4 ± 1.6	40.0 ± 1.1**	32.4 ± 1.2	35.7 ± 1.1**
$R_{L,25}$	µmol m^{-2} s^{-1}	6.2 ± 0.1	3.2 ± 0.1**	3.2 ± 0.1	0.5 ± 0.4**
ΔH_a	kJ mol^{-1}	44.8	105.8	191.3	916.0
ΔH_d	kJ mol^{-1}	186.4	190.1	255.3	982.6
ΔS	kJ mol^{-1}	0.61	0.62	0.86	3.25
$T_{opt}(R_L)$	°C	30.0 ± 0.2	35.3 ± 0.1**	25.8 ± 0.5	34.2 ± 3.3**