Supplementary Materials

Temperature sensitivity of CO_2 and CH_4 fluxes from coarse woody debris in northern boreal forests.

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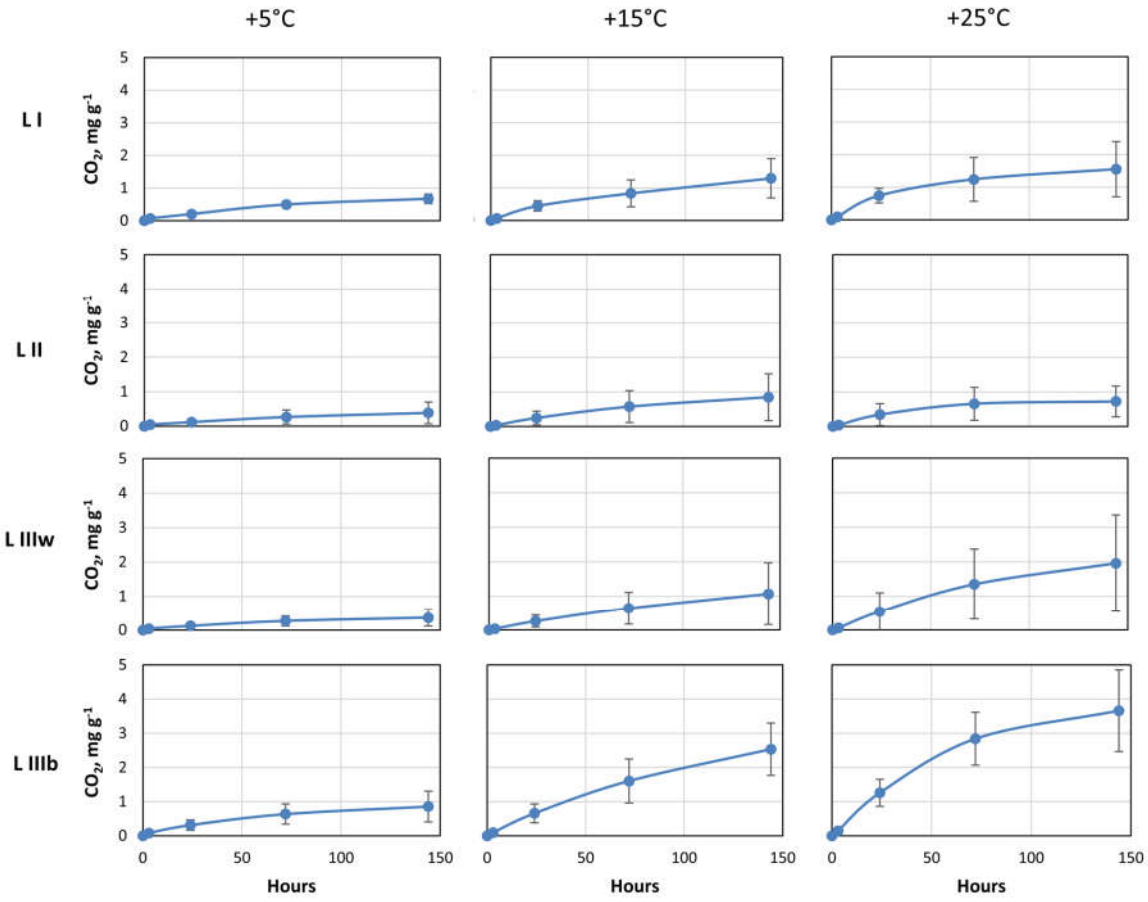

Figure S1. Cumulative CO_2 production during decomposition of larch wood: L I – L III – decomposition classes of larch wood; L IIIw and L IIIb – larch wood at DCIII decomposed by white and brown rot fungi respectively. The error bars indicate average deviation from the mean values calculated for three-seven samples taken from different logs of the same DC.

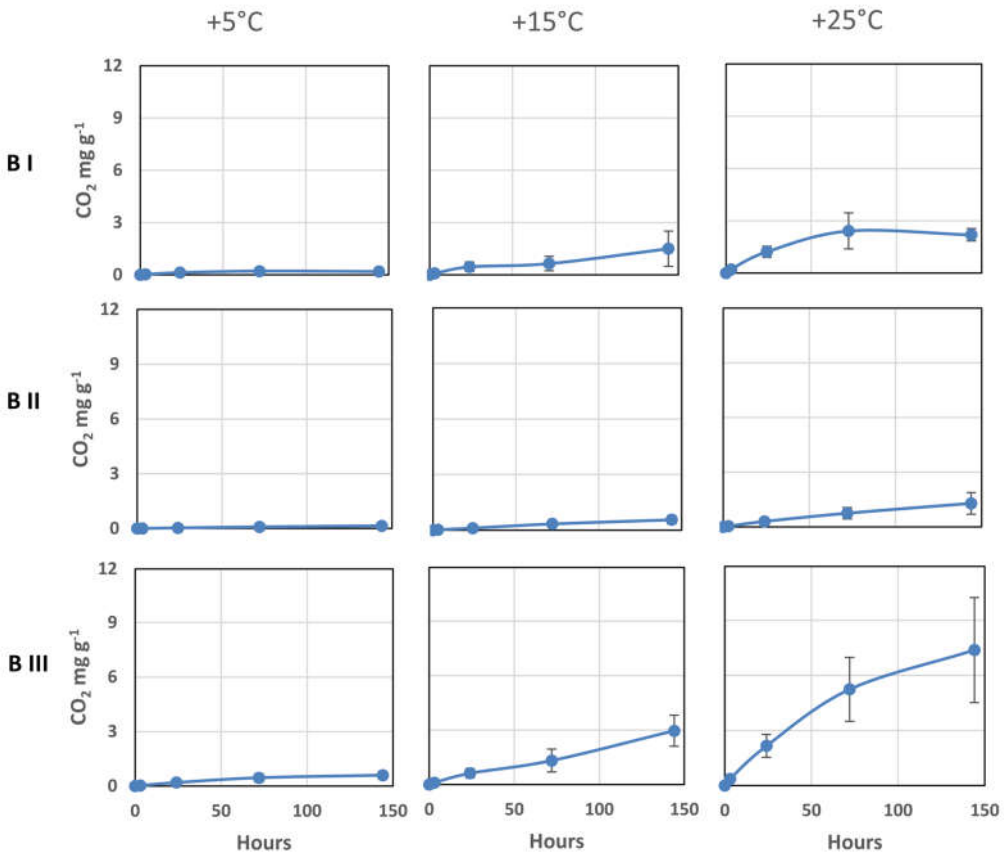

Figure S2. Cumulative CO_2 production during decomposition of birch wood: B I – B III – decomposition classes of birch wood. The error bars indicate average deviation from the mean values calculated for three samples taken from different logs of the same DC.

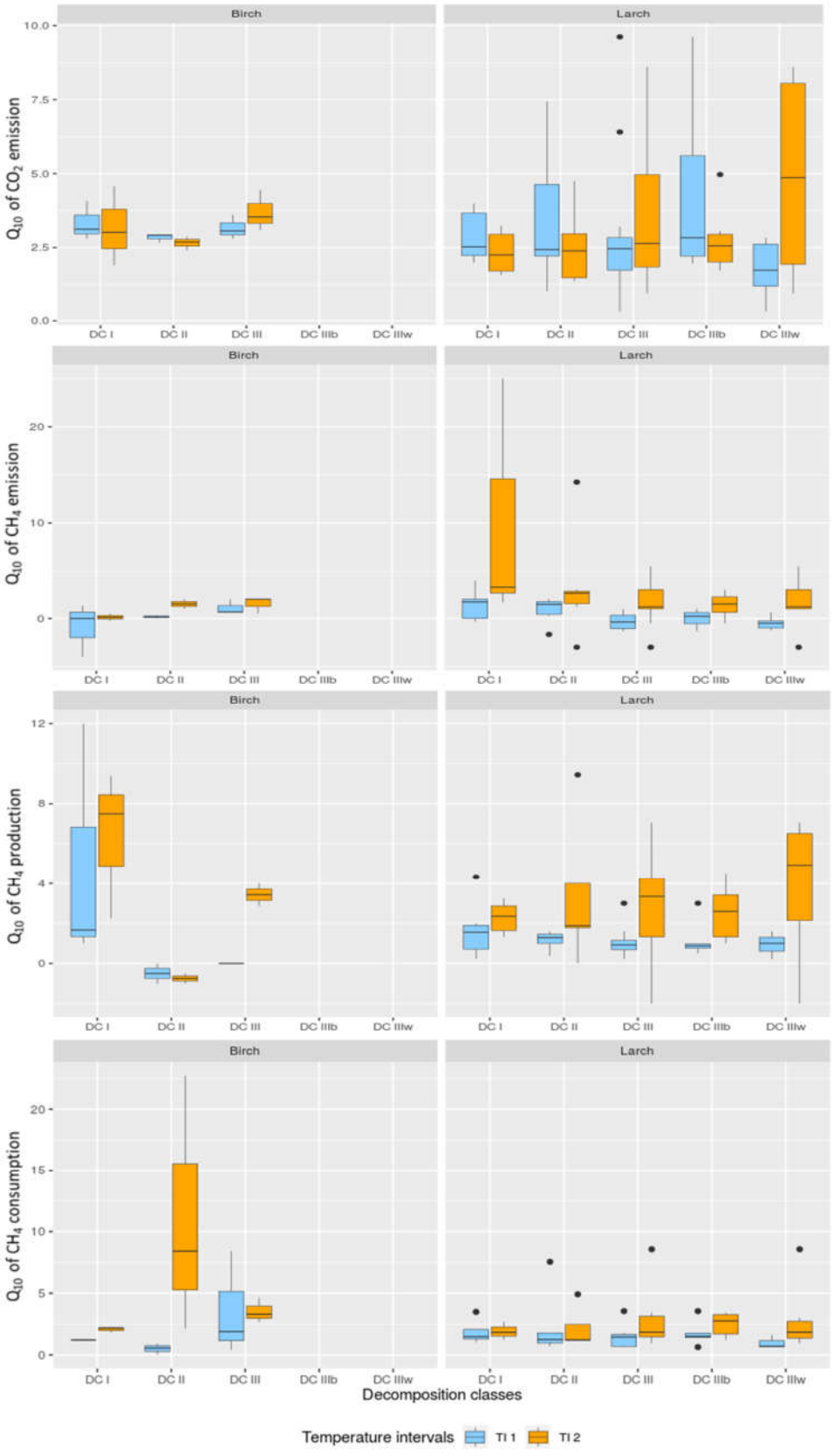

Figure S3. Box plots of temperature coefficient Q_{10} of CO_2 and CH_4 fluxes from birch (a) and larch (b) wood of different classes of decomposition at two temperature intervals: TI 1 - +5°C to +15°C; TI 2 - +15°C to +25°C

Table S1. Analysis of covariance (ANCOVA) between CO_2 and CH_4 fluxes and the explaining variables in the laboratory incubation experiment

	CO_2 emission (μg g^{-1} h^{-1}) R^2=0.62***			**CH_4 flux (μg g^{-1} h^{-1})** R^2=0.33***			**CH_4 production (μg g^{-1} h^{-1})** R^2=0.51***			**CH_4 consumption (μg g^{-1} h^{-1})** R^2=0.55***		
ANCOVA	***F***	***P***	***Eta-squared***	***F***	***P***	***Eta-squared***	***F***	***P***	***Eta-squared***	***F***	***P***	***Eta-squared***
Intercept	2.9	n.s		7.8	**		11.0	***		1.1	n.s	
Density	5.2	*	0.020	8.0	**	0.064	15.9	***	0.075	3.3	n.s	0.016
Moisture	24.2	***	0.094	0.3	n.s	0.002	11.5	***	0.054	20.3	***	0.101
Moisture^2	25.8	***	0.100	0.0	n.s	0.000	12.4	***	0.058	18.2	***	0.091
Species	1.1	n.s	0.004	1.1	n.s	0.009	2.6	n.s	0.012	0.7	n.s	0.004
Decay class (DC)	7.0	***	0.054	5.3	**	0.084	9.2	***	0.087	3.6	*	0.036
Temperature (Temp)	27.9	***	0.216	2.3	n.s	0.036	17.5	***	0.164	12.7	***	0.126
Species×DC	4.7	*	0.036	0.3	n.s	0.006	4.0	*	0.037	3.5	*	0.035
Species×Temp	3.3	*	0.025	0.2	n.s	0.004	2.6	n.s	0.024	3.9	*	0.039
DC×Temp	4.5	***	0.070	1.6	n.s	0.050	1.5	n.s	0.028	3.9	**	0.078
Species×DC×Temp	1.7	n.s	0.026	0.4	n.s	0.012	1.5	n.s	0.028	1.0	n.s	0.019
Error			0.356			0.733			0.433			0.457

* P<0.05, ** P<0.01, ***P<0,005, n.s. - not significant

CO_2 – the rate of CO_2 flux; CH_4 measured – the measured rate of CH_4 flux; CH_4 calculated - the rate of CH_4 flux calculated based on $^{13}CH_4$ accumulation; CH_4 consumption - the rate of methane consumption calculated as difference between CH_4 calculated and CH_4 measured

Table S2. Analysis of covariance (ANCOVA) between CO_2 and CH_4 fluxes and the explaining variables separately for decomposition of larch and birch CWD

	CO_2 emission (μg g^{-1} h^{-1})			**CH_4 flux (μg g^{-1} h^{-1})**			**CH_4 production (μg g^{-1} h^{-1})**			**CH_4 consumption (μg g^{-1} h^{-1})**		
ANCOVA	***F***	***P***	***Eta-squared***	***F***	***P***	***Eta-squared***	***F***	***P***	***Eta-squared***	***F***	***P***	***Eta-squared***
Larch CWD												
	R^2=0.51***			R^2=0.28***			R^2=0.44***			R^2=0.44***		
Intercept	0.1	n.s		8.4	***		5.7	*		0.0	n.s	
Density	1.9	n.s	0.015						0.081	1.0	n.s	0.009
Moisture	17.0	***	0.132	0.0	n.s	0.000	11.2	***	0.087	14.5	***	0.134
Moisture^2	9.3	***	0.072	0.1	n.s	0.001	7.0	*	0.054	7.7	**	0.071
Decay class (DC)	0.9	n.s	0.014	7.9	***	0.146	6.5	***	0.100	0.0	n.s	0.001
Temperature (Temp)	10.7	***	0.167	3.1	*	0.058	6.5	***	0.101	2.2	n.s	0.041
DC×Temp	0.7	n.s	0.023	1.1	n.s	0.039	0.2	n.s	0.005	1.7	n.s	0.064
Error			0.576			0.684			0.572			0.680
Birch CWD												
	R^2=0.92***			R^2=0.49			R^2=0.84***			R^2=0.86***		
Intercept	4.4	n.s		2.1	n.s		0.0	n.s		3.1	n.s	
Density	3.8	n.s	0.022	1.8	n.s	0.070	0.0	n.s	0.000	2.6	n.s	0.029
Moisture	0.3	n.s	0.002	1.5	n.s	0.058	0.6	n.s	0.007	0.4	n.s	0.004
Moisture^2	0.5	n.s	0.003	1.0	n.s	0.039	1.6	n.s	0.017	0.0	n.s	0.000
Decay class (DC)	18.4	***	0.214	0.1	n.s	0.007	8.3	***	0.183	9.2	***	0.203
Temperature (Temp)	40.2	***	0.468	0.6	n.s	0.046	21.0	***	0.463	18.1	***	0.399
DC×Temp	8.8	***	0.204	1.3	n.s	0.199	3.7	*	0.165	4.5	*	0.200
Error			0.087			0.581			0.165			0.165

Superscripts and name of fluxes are similar to the Table S1

Table S3. Analysis of covariance (ANCOVA) between CH_4 fluxes and the explaining variables (including rate of CO_2 emission) in the laboratory incubation experiment

	CH_4 flux (μg g^{-1} h^{-1}) R^2=0.33			**CH_4 production (μg g^{-1} h^{-1}) R^2=0.72**			**CH_4 consumption (μg g^{-1} h^{-1}) R^2=0.79**		
ANCOVA	***F***	***P***	***Eta-squared***	***F***	***P***	***Eta-squared***	***F***	***P***	***Eta-squared***
CO_2	1.0	n.s	0.001	70.8	***	0.354	107.5	***	0.511
Intercept	7.1	***		8.2	***		0.1	n.s	
Density	7.0	***	0.058	10.2	***	0.051	0.0	n.s	0.000
Moisture	0.4	n.s	0.003	0.0	n.s	0.000	1.3	n.s	0.006
Moisture^2	0.1	n.s	0.001	0.0	n.s	0.000	0.5	n.s	0.002
Species	1.0	n.s	0.008	1.5	n.s	0.008	0.0	n.s	0.000
Decay class (DC)	4.9	***	0.081	5.9	***	0.059	0.0	n.s	0.000
Temperature (Temp)	1.4	n.s	0.023	2.1	n.s	0.021	0.3	n.s	0.003
Species×DC	0.3	n.s	0.005	1.3	n.s	0.013	0.5	n.s	0.004
Species×Temp	0.3	n.s	0.004	0.4	n.s	0.004	0.9	n.s	0.008
DC×Temp	1.6	n.s	0.053	0.4	n.s	0.009	1.1	n.s	0.021
Species×DC×Temp	0.4	n.s	0.012	1.3	n.s	0.026	0.6	n.s	0.012
Error			0.751			0.455			0.432

Superscripts and name of fluxes are similar to the Table S1