

Table S1. The average air temperature, the height of the snow cover and the time of its descent at different altitude levels of profiles 1 and 2 on the Imandra mountain and profiles 1, 2, 4 in the valley of Lake Small Vudayvr and profiles 1,2,3 Kitchepakh in 2018-2019. All sites are located in the Khibiny massif.

Profile and level	Exposition	Altitude a. s. l., m	Mean air temperature ± SD (° C)				Snow depth (cm)		
			15-31 July 2018	1-31 August 2018	1-30 June 2019	1-15 July 2019	Minimum	Average ± SD	Maximum
Imandra									
1_1	S	410	23.4±5.1	13.0±4.8	10.3±5.7	8.1±3.5	8	24±17	41
1_2	S	400	-	-	-	-	29	49±20	69
1_3	S	391	22.4±5.6	12.7±4.7	10.0±5.8	8.1±3.6	42	62±20	83
2_1	N	414	22.8±5.5	12.8±4.9	10.1±5.8	8.0±3.6	17	27±9	36
2_2	N	393	-	-	-	-	104	138±34	172
2_3	N	370	21.8±5.0	12.3±4.5	9.6±5.5	7.5±3.3	90	117±27	144
Small Vudayvr									
1_1	NE	602	-	-	-	-	150	206±30	263
1_2	NE	525	-	-	-	-	156	238±43	330
1_3	NE	496	19.3±3.3	11.7±3.9	9.4±3.8	9.0±2.4	169	209±15	254
1_4	NE	480	-	-	-	-	118	177±26	249
2_1	E	600	19.7±3.2	11.7±4.0	9.7±4.0	9.1±2.7	175	225±23	280
2_2	E	572	-	-	-	-	128	219±32	275
2_3	E	530	-	-	-	-	165	206±20	270
4_1	SE	662	20.4±3.2	11.1±3.8	9.1±4.3	8.1±3.1	51	149±47	251
4_2	SE	602	-	-	-	-	96	187±33	290
4_3	SE	560	20.6±2.8	11.9±3.8	9.6±4.2	9.0±2.9	115	196±35	320
Kitchepakh									
1_1	E	409	21.9±5.2	12.6±4.4	10.8±6.1	-	5	73±29	138
1_2	E	350	-	-	-	-	20	109±34	188
1_3	E	323	22.6±6.0	13.2±4.5	11.2±5.8	-	92	159±38	227
1_4	E	288	-	-	-	-	108	148±15	210
2_1	SE	433	-	-	-	-	26	158±58	257
2_2	SE	370	-	-	-	-	70	183±34	280
2_3	SE	334	-	-	-	-	36	140±36	290
2_4	SE	305	-	-	-	-	117	144±12	179
3_1	S	447	21.3±5.3	12.2±4.3	10.6±6.0	-	2	79±41	166
3_2	S	375	22.1±6.0	12.6±4.6	10.7±6.1	-	11	144±45	232
3_3	S	333	22.5±5.9	13.1±4.4	11.1±5.8	-	80	138±35	188
3_4	S	306	-	-	-	-	122	148±8	171

Table S2. Average air temperature, the height of the snow cover and the time of its melting at different altitude levels of the profiles on the slopes of the Sukhie Gory massif (Putorana Plateau region) in 2018-2019.

Profile and level	Exposition	Altitude a. s. l., m	Average air temperature \pm SD ($^{\circ}$ C)				Snow depth (cm)		
			15-31 August 2018	1-31 September 2018	1-30 May 2019	1-15 June 2019	Minimum	Average \pm SD	Maximum
1_1	S	604	10.4 \pm 5.1	2.5 \pm 4.8	-1.3 \pm 5.7	7.0 \pm 3.5	0	20 \pm 1	85
1_2	S	586	10.6 \pm 5.1	3.2 \pm 4.8	-2.4 \pm 5.7	6.6 \pm 3.5	50	166 \pm 3	255
1_3	S	563	10.6 \pm 5.1	3.4 \pm 4.8	-2.4 \pm 5.7	6.6 \pm 3.5	50	106 \pm 2	190
1_4	S	515	–	–	–	–	90	124 \pm 2	170
2_1	N	380	–	–	–	–	–	–	–
2_2	N	335	12.3 \pm 5.0	4.8 \pm 4.5	0.3 \pm 5.5	8.7 \pm 3.3	55	88 \pm 2	140
2_3	N	258	12.2 \pm 5.0	4.8 \pm 4.5	0.5 \pm 5.5	9.0 \pm 3.3	105	161 \pm 2	215
2_4	N	224	–	–	–	–	105	140 \pm 3	230
3_1	W	630	10.4 \pm 3.3	2.5 \pm 3.9	-1.3 \pm 3.8	7.0 \pm 2.4	5	70 \pm 3	195
3_3	W	579	10.8 \pm 3.3	3.2 \pm 3.9	-0.9 \pm 3.8	7.3 \pm 2.4	25	128 \pm 4	207
3_5	W	500	10.9 \pm 3.3	3.2 \pm 3.9	0.0 \pm 3.8	7.9 \pm 2.4	76	131 \pm 2	191
3_7	W	458	–	–	–	–	80	130 \pm 4	195
4_1	E	620	10.7 \pm 3.2	3.2 \pm 4.0	-1.6 \pm 4.0	7.0 \pm 2.7	0	34 \pm 2	145
4_3	E	458	11.2 \pm 3.2	3.9 \pm 4.0	-0.7 \pm 4.0	7.5 \pm 2.7	0	75 \pm 2	190
4_5	E	413	11.7 \pm 3.2	4.3 \pm 4.0	-0.3 \pm 4.0	7.8 \pm 2.7	0	76 \pm 4	246
4_7	E	358	–	–	–	–	55	132 \pm 3	205

Table S3. Average morphometric parameters of trees (mean value \pm standard deviation, SD) and areal characteristics of forest stands at different altitude levels of altitude profiles within the forest-tundra ecotone (1-3 levels) and the upper part of the mountain-forest belt (level 4) on the slopes of the mountains on the slopes of Mount Imandra (Khibiny massif). Species' abbreviations: BP, birch; PS, Scots pine; PO, Norway spruce.

Profile and level	Exposition	Altitude a. s. l, m	Species	Diameter at base (cm)		Stem height (m)		Age (years)		Crown diameter (m)		Crown projective cover m ² /ha	Sum of the cross- sectional areas of the stems, m ² /ha	Density, ind./ha	
				Mean	Max.	Mean	Max	Mean	Max	Mean	Max			<1.3m	>1.3m
1_1	S	410	BP	3.2 \pm 1.6	7.0	1.2 \pm 0.6	2.6	53 \pm 21	89	1.2 \pm 0.7	2.6	158	0.2	65	23
1_1	S	410	PS	2.1 \pm 1.9	11.8	0.7 \pm 0.5	4.2	19 \pm 13	58	0.5 \pm 0.4	1.8	90	0.2	241	45
1_2	S	400	BP	5.1 \pm 3.0	15.0	2.0 \pm 1.4	5.0	48 \pm 21	99	1.7 \pm 1.5	5.2	1517	1.9	133	1017
1_2	S	400	PS	9.2 \pm 6.3	32.5	3.5 \pm 2.1	9.8	43 \pm 27	184	1.4 \pm 0.9	5.2	2264	11.1	1517	1017
1_3	S	391	BP	4.2 \pm 2.3	9.2	1.8 \pm 0.9	3.1	53 \pm 27	103	1.4 \pm 0.8	3.2	627	0.5	83	217
1_3	S	391	PS	10.3 \pm 6.3	28.7	5.2 \pm 2.9	13.2	49 \pm 18	82	1.5 \pm 0.8	4.1	5188	26.1	1983	2233
1_4	S	354	PS	9.4 \pm 9.9	51.0	5.8 \pm 4.0	16.0	50 \pm 32	258	1.6 \pm 1.3	7.2	10319	49.8	867	3450
2_1	S	414	BP	3.6 \pm 1.6	9.2	1.8 \pm 0.6	3.2	77 \pm 28	135	1.8 \pm 0.8	3.9	206	0.3	31	119
2_1	S	414	PS	5.4 \pm 3.0	13.1	1.8 \pm 0.9	4.0	44 \pm 14	58	1.0 \pm 0.4	1.6	38	0.1	43	20
2_2	S	393	BP	3.7 \pm 2.2	13.4	1.5 \pm 0.7	4.1	92 \pm 35	180	1.5 \pm 0.8	3.8	4283	6.7	650	1033
2_3	S	370	BP	4.0 \pm 2.8	26.4	1.9 \pm 1.2	7.6	91 \pm 45	231	1.7 \pm 0.9	4.8	6279	12.1	667	1567
2_4	S	345	BP	8.1 \pm 5.3	24.2	5.8 \pm 2.6	14.0	80 \pm 25	146	3.3 \pm 1.8	9.6	9033	15.6	83	833
2_4	S	345	PO	18.8 \pm 13.5	45.5	9.0 \pm 4.3	18.9	119 \pm 62	302	3.2 \pm 1.2	6.1	2636	17.7	0	383

Table S4. Average morphometric parameters of birch trees (mean value \pm SD) and areal characteristics of forest stands at different altitude levels of altitude profiles within the forest-tundra ecotone (1-3 levels) and the upper part of the mountain-forest belt (level 4) on the slopes of the mountains in the valley of the lake. Small Vudayvr (Khibiny massif).

Profile and level	Exposition	Altitude a. s. L, m	Diameter at base (cm)		Stem height (m)		Age (years)		Crown diameter (m)		Crown projective cover m ² /ha	Sum of the cross- sectional areas of the stems, m ² /ha	Density, ind./ha	
			Mean	Max.	Mean	Max	Mean	Max	Mean	Max			<1.3m	>1.3m
1_1	N E	602	6.2 \pm 4.5	26.8	2.4 \pm 1.1	5.1	50 \pm 22	101	1.7 \pm 1.0	4.4	2860	8.4	183	733
1_2	N E	523	5.9 \pm 5.1	27.4	2.8 \pm 1.6	7.8	50 \pm 21	95	1.9 \pm 1.2	6.0	4128	11.0	183	850
1_3	N E	497	7.5 \pm 5.4	22.1	3.3 \pm 2.0	8.8	58 \pm 23	105	2.1 \pm 1.4	7.4	6639	16.5	250	1183
1_4	N E	479	9.2 \pm 5.8 \pm	27.4	6.0 \pm 3.0	13.5	73 \pm 18	104	2.8 \pm 1.4	6.1	9081	18.8	0	1183
2_1	E	552	5.7 \pm 3.8	16.2	2.2 \pm 1.3	5.0	46 \pm 22	96	1.6 \pm 1.2	4.1	1878	4.5	150	467
2_2	E	501	6.7 \pm 5.9	27.5	2.5 \pm 2.2	7.0	36 \pm 21	84	1.6 \pm 1.5	5.5	2548	9.1	317	367
2_3	E	481	8.6 \pm 6.0	29.0	3.7 \pm 2.2	9.6	52 \pm 19	97	2.2 \pm 1.4	6.0	3824	10.9	67	617
2_4	E	446	7.3 \pm 5.5	27.4	4.8 \pm 2.8	10.4	75 \pm 30	166	2.6 \pm 1.4	7.0	10949	27.2	117	1383
3_1	SE	630	3.9 \pm 3.3	21.0	1.4 \pm 1.1	4.6	32 \pm 18	101	1.0 \pm 0.9	4.1	1338	3.5	533	350
3_2	SE	566	4.3 \pm 3.8	17.5	1.6 \pm 1.1	5.3	31 \pm 14	77	1.0 \pm 1.0	4.7	3382	12.1	950	1067
3_3	SE	542	5.8 \pm 4.4	21.3	2.7 \pm 1.6	7.4	52 \pm 27	143	2.2 \pm 1.4	6.0	6859	27.1	233	1067
3_4	SE	490	8.9 \pm 5.7	33.4	7.4 \pm 3.0	12.5	81 \pm 25	196	2.9 \pm 1.5	7.8	11862	28.4	50	1433
4_1	S W	663	2.3 \pm 2.1	13.7	0.8 \pm 0.6	2.6	31 \pm 19	113	0.7 \pm 0.7	3.9	1824	2.8	1933	500
4_2	S W	602	5.1 \pm 3.4	17.5	1.9 \pm 1.1	4.4	56 \pm 29	122	1.5 \pm 1.1	6.2	5611	16.0	667	1267
4_3	S W	569	4.6 \pm 3.7	16.9	1.9 \pm 1.2	4.3	50 \pm 32	117	1.5 \pm 1.3	4.3	10244	21.5	1083	1467
4_4	S W	514	6.3 \pm 4.5	24.2	4.3 \pm 1.8	9.0	82 \pm 28	140	3.0 \pm 1.4	6.6	13301	32.8	83	1450

Table S5. Average morphometric parameters of trees (mean value \pm SD) and areal characteristics of forest stands at various altitude levels of altitude profiles within the forest-tundra ecotone (1-3 levels) and the upper part of the mountain-forest belt (4-5 levels) on the slopes of Mount Kitchepakh (Khibiny massif). Species' abbreviations: BP, birch; PO, Norway spruce.

Profile and level	Exposition	Altitude a. s. l., m	Species	Diameter at base (cm)		Stem height (m)		Age (years)		Crown diameter (m)		Crown projective cover m ² /ha	Sum of the cross- sectional areas of the stems, m ² /ha	Density, ind./ha	
				Mean	Max.	Mean	Max	Mean	Max	Mean	Max			<1.3m	>1.3m
1_1	E	409	BP	3.9 \pm 2.4	11.8	1.2 \pm 0.9	4.4	43 \pm 19	94	1.0 \pm 0.8	3.4	552	1.2	213	263
1_2	E	350	BP	5.9 \pm 3.2	17.8	2.2 \pm 1.0	4.8	61 \pm 25	133	1.9 \pm 1.1	5.8	6523	14.2	225	1488
1_2	E	350	PO	9.2 \pm 7.2	23.1	2.4 \pm 2.0	7.0	49 \pm 34	117	1.5 \pm 0.9	3.4	88	0.4	38	38
1_3	E	323	BP	5.5 \pm 4.3	23.6	1.8 \pm 1.0	5.5	47 \pm 22	129	1.2 \pm 1.0	6.6	5688	15.8	650	2400
1_3	E	323	PO	5.7 \pm 5.3	38.0	1.7 \pm 1.6	6.8	38 \pm 20	95	0.9 \pm 0.9	4.7	513	2.3	238	125
1_4	E	288	BP	4.5 \pm 3.0	15.8	2.7 \pm 1.6	7.0	60 \pm 28	133	1.3 \pm 0.9	4.3	3991	11.4	625	1675
1_4	E	288	PO	14.8 \pm 10.3	47.8	5.5 \pm 2.4	10.0	89 \pm 55	286	2.8 \pm 1.4	6.1	3801	22.5	650	825
1_5	E	265	BP	5.8 \pm 4.4 \pm	27.2	4.6 \pm 2.4	9.3	77 \pm 25	148	2.4 \pm 1.2	5.4	5968	12.0	25	1175
1_5	E	265	PO	14.0 \pm 12.7 \pm	46.2	6.3 \pm 5.4	21	105 \pm 61	249	2.1 \pm 1.4	4.9	4334	29.7	250	675
2_1	SE	433	BP	3.9 \pm 3.0	11.5	1.2 \pm 0.8	2.6	44 \pm 22	94	1.0 \pm 0.7	2.5	472	0.8	138	250
2_1	SE	433	PO	4.5 \pm 3.1	13.3	0.9 \pm 0.5	2.0	52 \pm 32	126	1.2 \pm 1.0	3.4	175	0.3	50	50
2_2	SE	370	BP	8.5 \pm 3.6	20.9	2.2 \pm 1.0	4.7	80 \pm 29	195	2.5 \pm 1.3	6.0	4799	10.4	50	750
2_3	SE	334	BP	7.8 \pm 4.3	30.3	2.5 \pm 1.1	6.6	74 \pm 26	121	2.2 \pm 1.0	4.4	4761	11.8	25	613
2_3	SE	334	PO	11.5 \pm 8.1	38.2	3.1 \pm 1.9	7.6	93 \pm 39	201	1.8 \pm 1.0	4.2	1728	13.7	150	338
2_4	SE	305	BP	7.5 \pm 1.7	10.8	3.8 \pm 0.6	4.2	119 \pm 55	168	4.5 \pm 1.0	5.6	1297	1.5	175	75
2_4	SE	305	PO	6.0 \pm 4.2	27.4	3.2 \pm 1.5	7.3	71 \pm 32	194	2.0 \pm 1.1	6.5	5582	15.2	1125	1275
2_5	SE	280	BP	5.6 \pm 4.1	19.4	3.9 \pm 2.1	9.0	73 \pm 22	111	2.0 \pm 1.0	4.7	2723	6.4	25	750
2_5	SE	280	PO	11.6 \pm 9.9	47.8	5.5 \pm 3.8	16.0	92 \pm 56	310	1.9 \pm 1.0	5.4	5389	30.3	950	1425
3_1	S	447	BP	5.0 \pm 3.3	18.8	1.1 \pm 0.5	2.3	53 \pm 23	109	1.9 \pm 1.4	4.2	2137	2.2	63	388
3_2	S	375	BP	6.6 \pm 3.0	17.2	2.2 \pm 0.9	3.8	73 \pm 24	136	2.4 \pm 1.5	7.2	6759	12.6	100	1000
3_3	S	333	BP	7.7 \pm 4.6	33.4	2.8 \pm 1.2	5.7	79 \pm 27	161	2.6 \pm 1.3	6.0	6176	23.9	25	375
3_3	S	333	PO	12.2 \pm 8.7	31.2	3.2 \pm 2.4	7.0	88 \pm 37	158	1.8 \pm 1.2	4.3	702	6.7	38	88
3_4	S	306	BP	7.0 \pm 4.6	24.5	4.6 \pm 1.7	8.2	81 \pm 30	139	2.7 \pm 1.2	5.8	6098	15.5	25	900
3_4	S	306	PO	12.4 \pm 9.4	40.8	6.0 \pm 3.1	11.3	129 \pm 67	282	2.1 \pm 1.0	4.4	4570	33.7	150	1050

Table S6. Average morphometric parameters of larch trees (mean value \pm SD) and areal characteristics of forest stands at different altitude levels of altitude profiles within the forest-tundra ecotone (levels 1-3) and the upper part of the mountain-forest belt (level 4) on the slopes of the Sukhie Gory massif (Putorana Plateau).

Profile and level	Exposition	Altitude a. s. l., m	Diameter at base (cm)		Stem height (m)		Age (years)		Crown diameter (m)		Crown projective cover m ² /ha	Sum of the cross-sectional areas of the stems, m ² /ha
			Mean	Max.	Mean	Max	Mean	Max	Mean	Max		
1_1	S	604	5.8 \pm 3.0	12.7	2.0 \pm 1.0	3.8	41 \pm 19	120	1.4 \pm 0.7	2.9	591	1.0
1_3	S	586	7.6 \pm 5.2	25.5	3.7 \pm 2.0	10.0	51 \pm 26	139	2.1 \pm 1.2	5.1	3528	8.1
1_5	S	563	13.1 \pm 11.6	50.0	5.4 \pm 3.8	12.5	92 \pm 63	354	2.5 \pm 2.0	8.0	6082	18.8
1_7	S	515	17.6 \pm 11.6	49.0	7.3 \pm 4.4	19.5	-	-	2.5 \pm 1.5	7.2	8097	44.7
2_1	E	620	9.0 \pm 4.5	27.0	3.8 \pm 2.0	9.0	52 \pm 29	176	1.9 \pm 0.9	3.8	439	1.0
2_3	E	458	10.8 \pm 7.9	38.0	5.7 \pm 3.4	14.0	88 \pm 52	227	2.2 \pm 1.1	4.8	2548	7.9
2_5	E	413	8.5 \pm 8.2	43.0	4.7 \pm 3.7	14.0	71 \pm 54	391	1.8 \pm 1.3	5.5	4444	13.8
2_7	E	358	17.6 \pm 13.1	62.0	7.5 \pm 5.0	21.0	-	-	2.4 \pm 1.7	8.0	6326	34.9
4_1	W	630	7.6 \pm 5.6	31.0	3.4 \pm 2.3	11.0	56 \pm 42	340	1.4 \pm 0.8	3.8	1452	5.0
4_3	W	579	10.2 \pm 8.1	30.0	5.4 \pm 4.4	17.5	91 \pm 77	312	2.1 \pm 1.9	7.8	3962	8.0
4_5	W	500	17.0 \pm 8.7	40.0	7.4 \pm 3.8	17.0	151 \pm 51	268	3.1 \pm 1.6	8.0	13096	37.2
4_7	W	458	19.5 \pm 9.8	46.0	8.3 \pm 3.3	15.5	-	-	2.2 \pm 1.0	5.0	7065	55.3
5_1	N	380	11.3 \pm 9.3	37.0	3.5 \pm 2.0	8.5	85 \pm 40	171	2.7 \pm 1.9	7.8	2342	4.5
5_3	N	258	15.2 \pm 11.3	48.0	6.1 \pm 3.9	15.2	83 \pm 52	286	3.5 \pm 2.3	10.4	10587	22.1
5_5	N	224	27.5 \pm 12.4	52.0	10.5 \pm 4.7	20.8	-	-	3.8 \pm 1.5	7.8	6181	37.9
5_7	N	204	20.9 \pm 11.7	54.0	15.6 \pm 6.6	25.0	-	-	2.0 \pm 0.9	3.9	4666	55.8

Table S7. Spearman correlation coefficients calculated between the number of trees recruited in the Khibiny massif treeline ecotones over five years and climatic parameters corresponding to previous (first value in each cell) and current (second value in each cell) five-year periods (values with a significance level of $p < 0.05$ are highlighted in red).

Exposition	Altitudinal level				
	1	3	5	7	All
Mount Imandra (Scots pine)					
Precipitation in July					
N	0.55 / 0.50	-0.38 / -0.46	- / -	- / -	0.20 / 0.07
S	0.57 / 0.67	0.39 / 0.64	0.54 / 0.47	0.14 / -0.13	0.45 / 0.51
All	0.63 / 0.71	0.35 / 0.60	0.54 / 0.47	0.14 / -0.13	0.45 / 0.51
Precipitation between November and December - / -					
N	0.55 / 0.07	-0.38 / -0.46	- / -	- / -	0.20 / -0.35
S	0.70 / 0.63	0.58 / 0.58	-0.11 / -0.04	0.30 / 0.04	0.35 / 0.26
All	0.71 / 0.49	0.56 / 0.56	-0.11 / -0.04	0.30 / 0.04	0.35 / 0.26
Snow depth at the end of December					
N	0.51 / 0.40	-0.59 / -0.31	- / -	- / -	-0.19 / 0.11
S	0.72 / 0.86	0.70 / 0.81	0.10 / 0.16	0.44 / 0.17	0.53 / 0.56
All	0.70 / 0.77	0.67 / 0.80	0.10 / 0.16	0.44 / 0.17	0.53 / 0.56
Small Vudayvr (birch)					
Precipitation in July					
NE	0.17 / 0.10	0.04 / -0.53	0.06 / -0.15	-0.50 / -0.40	0.12 / -0.25
E	0.11 / 0.18	0.37 / 0.67	-0.31 / -0.52	-0.63 / -0.25	-0.51 / -0.20
SE	0.58 / 0.28	0.39 / 0.15	-0.02 / -0.17	-0.25 / -0.54	0.49 / 0.05
SW	0.63 / 0.48	0.34 / 0.07	0.33 / 0.14	-0.43 / -0.47	0.58 / 0.31
All	0.62 / 0.49	0.41 / 0.04	0.13 / -0.08	-0.59 / -0.57	0.44 / 0.10
Precipitation between November and December					
NE	0.21 / 0.38	0.32 / -0.08	-0.13 / -0.14	-0.62 / -0.81	0.03 / -0.23
E	0.33 / 0.42	0.55 / 0.45	-0.04 / -0.17	-0.35 / -0.31	-0.07 / 0.06
SE	0.44 / 0.59	0.74 / 0.61	0.16 / 0.40	-0.55 / -0.76	0.56 / 0.57
SW	0.76 / 0.67	0.61 / 0.32	0.65 / 0.45	-0.10 / -0.43	0.81 / 0.57
All	0.66 / 0.71	0.76 / 0.45	0.35 / 0.37	-0.55 / -0.80	0.64 / 0.48
Snow depth at the end of December					
NE	0.38 / 0.37	0.27 / 0.11	-0.13 / -0.12	-0.81 / -0.81	-0.03 / -0.11
E	0.35 / 0.42	0.51 / 0.64	0.19 / -0.18	-0.44 / -0.35	0.14 / -0.08
SE	0.66 / 0.55	0.88 / 0.61	0.44 / 0.37	-0.69 / -0.78	0.68 / 0.54
SW	0.86 / 0.80	0.59 / 0.40	0.66 / 0.55	-0.34 / -0.59	0.82 / 0.71
All	0.83 / 0.77	0.79 / 0.56	0.50 / 0.42	-0.72 / -0.84	0.72 / 0.56
Mount Kipchepakhk (birch)					
Precipitation in July					
E	-0.08 / -0.04	-0.48 / -0.56	0.07 / 0.00	-0.72 / -0.04	-0.28 / -0.18
SE	0.63 / 0.39	-0.64 / -0.74	-0.62 / -0.71	-0.53 / -0.33	-0.63 / -0.66
S	-0.34 / -0.58	-0.57 / -0.62	-0.63 / -0.53	-0.21 / -0.52	-0.55 / -0.62
All	0.03 / -0.15	-0.64 / -0.69	-0.32 / -0.13	-0.65 / -0.53	-0.50 / -0.46
Precipitation between November and December					
E	0.28 / -0.07	0.02 / -0.33	0.55 / 0.23	0.01 / -0.01	0.20 / 0.04
SE	0.00 / -0.05	-0.30 / -0.48	-0.18 / -0.48	0.02 / -0.41	0.24 / -0.58
S	-0.12 / -0.34	-0.52 / -0.55	-0.44 / -0.67	-0.42 / -0.57	-0.52 / -0.72
All	0.20 / -0.24	-0.19 / -0.49	0.14 / -0.17	-0.42 / -0.65	0.00 / 0.32
Snow depth at the end of December					
E	0.32 / 0.10	-0.04 / -0.34	0.56 / 0.36	-0.35 / -0.28	0.24 / 0.11
SE	0.19 / 0.12	-0.49 / -0.53	-0.43 / -0.51	-0.34 / -0.40	-0.49 / -0.57
S	-0.28 / -0.36	-0.67 / -0.61	-0.67 / -0.76	-0.44 / -0.72	-0.67 / -0.77
All	0.17 / -0.04	-0.32 / -0.49	0.00 / -0.06	-0.57 / -0.77	-0.15 / -0.33

Table S8. Spearman correlation coefficients calculated between the number of recruited larch trees on the Putorana Plateau treeline ecotones considering five-year age classes and climatic parameters corresponding to previous (first value in each cell) and current (second value in each cell) five-year periods (values with a significance level of $p < 0.05$ are highlighted in red)

Exposition	Altitudinal level				
	1	3	5	7	All
Air temperature in July					
N	-0.15 / 0.21	-0.24 / -0.32	-0.06 / -0.22	-0.06 / -0.22	-0.21 / -0.06
E	0.26 / 0.63	0.25 / 0.38	0.28 / 0.44	0.28 / -0.02	0.32 / 0.43
S	-0.42 / -0.64	0.35 / 0.19	-0.06 / 0.37	-0.36 / -0.09	0.10 / 0.22
W	0.24 / 0.72	0.49 / 0.62	0.32 / -0.08	-0.26 / -0.35	0.29 / 0.60
All	0.21 / 0.59	0.27 / 0.34	0.22 / 0.42	-0.12 / -0.01	0.17 / 0.40
Precipitation from October to December					
N	0.19 / 0.57	0.06 / 0.10	- / -	0.13 / 0.61	-0.01 / 0.31
E	0.46 / 0.60	0.41 / -0.01	0.70 / 0.77	-0.19 / -0.40	0.64 / 0.64
S	0.06 / 0.24	0.56 / 0.66	0.45 / 0.69	0.11 / 0.35	0.53 / 0.67
W	0.20 / 0.55	0.17 / 0.24	0.37 / 0.28	- / -	0.25 / 0.47
All	0.46 / 0.84	0.42 / 0.20	0.70 / 0.86	-0.07 / 0.24	0.49 / 0.78
Snow depth at the end of December					
N	0.34 / 0.49	-0.31 / 0.12	- / -	0.27 / 0.47	-0.12 / 0.19
E	0.81 / 0.29	0.44 / 0.23	0.61 / 0.58	-0.50 / -0.26	0.54 / 0.50
S	0.13 / 0.61	0.53 / 0.70	0.85 / 0.44	0.30 / 0.53	0.72 / 0.80
W	0.61 / 0.24	0.27 / 0.05	0.26 / 0.44	- / -	0.59 / 0.27
All	0.76 / 0.60	0.39 / 0.42	0.72 / 0.66	-0.03 / 0.09	0.68 / 0.71