Supporting information for

Is subarctic forest advance able to keep pace with climate change?

Rees, Hofgaard et al.

Supplement S1: Characteristics of site data used in the analyses, including data source for each entry. Descriptions of data inclusion in each column is presented below the table. nd = no data.

Study site	Source	Latitude (N)	Longitude (E)	Elevation, m a.s.l.	Zone	Tree species	Parameters	Period	Context	Behaviour	Recorded change, m	Advance rate, m/year
Fennoscandia (north of 64 ˚N) NO = Norway, SE = Sweden, FI = Finland												
Ånderdalen, NO	Mathisen & Hofgaard, 2011; Mathisen, Hofgaard, & Söderström, 2013	69.208	17.349	118	F	*Pinus sylvestris*	age structure, diameter growth, height growth	1815-2005	altitude	stationary	nd	nd
Ånderdalen, NO	Mathisen & Hofgaard, 2011; Mathisen et al. 2013	69.212	17.355	256	TL	*Pinus sylvestris*	age structure, diameter growth, height growth	1895-2005	altitude	stationary	nd	nd
Ånderdalen, NO	Mathisen & Hofgaard, 2011; Mathisen et al. 2013	69.228	17.337	291	T	*Pinus sylvestris*	age structure, diameter growth, height growth	1965-2000	altitude	stationary	nd	nd
Ånderdalen, NO	Aune, Hofgaard, & Söderström, 2011	69.198	17.331	310	TL, T	*Betula pubescens*	age structure	1890-2005	altitude	advance	nd	nd
Dividalen, NO	Mathisen & Hofgaard, 2011; Mathisen et al. 2013	68.859	19.604	366	F	*Pinus sylvestris*	age structure, diameter growth, height growth	1785-2000	altitude	stationary	nd	nd
Dividalen, NO	Mathisen & Hofgaard, 2011; Mathisen et al. 2013	68.863	19.614	552	TL	*Pinus sylvestris*	age structure, diameter growth, height growth	1935-2000	altitude	stationary	nd	nd
Dividalen, NO	Mathisen & Hofgaard, 2011; Mathisen et al. 2013	68.867	19.610	569	T	*Pinus sylvestris*	age structure, diameter growth, height growth	1930-2000	altitude	stationary	nd	nd
Dividalen, NO	Aune et al., 2011	68.850	19.700	625	TL, T	*Betula pubescens*	age structure	1895-2005	altitude	stationary	nd	nd
Børselv, NO	Mathisen & Hofgaard, 2011; Mathisen et al. 2013	70.297	25.549	40	F	*Pinus sylvestris*	age structure, diameter growth, height growth	1840-2005	altitude	advance	nd	nd
Børselv, NO	Mathisen & Hofgaard, 2011; Mathisen et al. 2013	70.289	25.576	142	TL	*Pinus sylvestris*	age structure, diameter growth, height growth	1780-2005	altitude	stationary	nd	nd

Study site	Source	Latitude (N)	Longitude (E)	Elevation, m a.s.l.	Zone	Tree species	Parameters	Period	Context	Behaviour	Recorded change, m	Advance rate, m/year
Olderfjord, NO	Aune et al., 2011	70.450	24.783	310	TL, T	*Betula pubescens*	age structure	1925-2005	altitude	stationary	nd	nd
Porsangmoen, NO	Mathisen & Hofgaard, 2011; Mathisen et al. 2013	69.953	25.158	110	F	*Pinus sylvestris*	age structure, diameter growth, height growth	1815-2005	altitude	advance	nd	nd
Porsangmoen, NO	Mathisen & Hofgaard, 2011; Mathisen et al. 2013	69.961	25.146	217	TL	*Pinus sylvestris*	age structure, diameter growth, height growth	1955-2000	altitude	advance	nd	nd
Porsangmoen, NO	Mathisen & Hofgaard, 2011; Mathisen et al. 2013	69.967	25.147	266	T	*Pinus sylvestris*	age structure, diameter growth, height growth	1950-1995	altitude	stationary	nd	nd
Porsangmoen, NO	Aune et al., 2011	69.926	25.228	350	TL, T	*Betula pubescens*	age structure	1925-2005	altitude	stationary	nd	nd
Jarfjord, NO	Mathisen & Hofgaard, 2011; Mathisen et al. 2013	69.658	30.250	76	TL	*Pinus sylvestris*	age structure, diameter growth, height growth	1930-2005	altitude	advance	nd	nd
Joatka, NO	Dalen & Hofgaard, 2005	69.743	23.883	450	TL	*Betula pubescens*	age structure; height growth	1940's-1990's	altitude	retreat	nd	nd
NW Norway	Normark, 2012	68.558–69.517	17.334–21.012	450–480	FL	*Betula pubescens*	repeat photography	1913-2011	altitude	advance, infilling	26	0.3
NW Norway	Normark, 2012	68.558–69.517	17.334–21.012	435–510	TL	*Betula pubescens*	repeat photography	1913-2011	altitude	advance	74	0.7
Sørdalen, NO	Roush, 2005	68.663	18.241	600	FTE	*Betula pubescens*	repeat photography	1930s-2005	altitude	infilling	nd	nd
Finnmark, NO	Hofgaard, Tømmervik, Rees, & Hanssen, 2013	69.500–71.250	21.200–31.000	< 100	FL	*Pinus sylvestris*	mapped tree distribution	1914-2009	latitude	advance	6786	71
Finnmark, NO	Hofgaard et al., 2013	69.500–71.250	21.200–31.000	< 100	TL	*Pinus sylvestris*	mapped tree distribution	1925-2009	latitude	advance	806	10
Finnmark, NO	Hofgaard et al., 2013	69.500–71.250	21.200–31.000	< 100	FL	*Betula pubecens*	mapped tree distribution	1914-2009	latitude	advance	14815	156
Finnmark, NO	Hofgaard et al., 2013	69.500–71.250	21.200–31.000	< 100	TL	*Betula pubecens*	mapped tree distribution	1949-2009	latitude	advance	20398	340
Border region NO-SE	Hofgaard, Rees, Hanssen, & Tømmervik, (unpublished)	68.200–69.250	17.900–21.900	100–800	FL	*Betula pubecens*	mapped tree distribution	1909-2008	altitude	advance	75	0.7
Border region NO-SE	Hofgaard et al. (unpublished)	68.200–69.250	17.900–21.900	100–800	FL	*Betula pubecens*	mapped tree distribution	1980-2008	altitude	advance	61	2.2
Torneträsk region, SE	Emanuelsson, 1987	68.354	18.816	400–700	FTE	*Betula pubescens*	review of historical documents	1900-1980s	altitude	advance	nd	nd

Study site	Source	Latitude (N)	Longitude (E)	Elevation, m a.s.l.	Zone	Tree species	Parameters	Period	Context	Behaviour	Recorded change, m	Advance rate, m/year
Abisko, SE	Dalen & Hofgaard, 2005	68.311	18.883	750	TL	*Betula pubescens*	age structure, height growth	1960's-1990's	altitude	stationary	nd	nd
Abisko, SE	Stöcklin & Körner, 1999	68.343	18.789	388	TL	*Pinus sylvestris*	age structure, size structure	1900s-1996	latitude	stationary, retreat	nd	nd
Torneträsk area, SE	van Bogaert et al., 2011	68.354	18.816	700	FL	*Betula pubescens*	repeat photography	1912-2009	altitude	advance	24	0.2
Mt. Vittangivaara, SE	Kullman & Engelmark, 1991	68.067	20.650	540	FL	*Picea abies*	age structure	1650-1980	altitude	stationary	nd	nd
Mt. Kuormakka, SE	Kullman, 1992	68.141	21.869	425–450	FL	*Pinus sylvestris*	age structure	1460-1990	latitude	infilling	nd	nd
Northern Sweden	Kullman & Engelmark, 1991; 1997	67.830–68.330	20.330–22.170	315–540	FL	*Picea abies*	age structure, location of individual trees	1655-1985	latitude	stationary, infilling	0	0
Kiruna, SE	Kullman, 1991	67.847	20.368	410	F	*Picea abies*	age structure, ring width	1750-1989	latitude	retreat, infilling	nd	nd
Northern Finland	Juntunen, Neuvonen, Norokorpi, & Tasanen, 2002	68.000–69.000	25.000–28.000	190–500	F	*Picea abies, Pinus sylvestris*	monitoring of stand structure	1983-1999	latitude	infilling	nd	nd
Kevo, FI	Holtmeier, 2005	68.500	26.250	240	TL	*Pinus sylvestris*	repeat photography	1969-1998	altitude	infilling	0	0
Kevo, FI	Holtmeier, 2005	68.500	26.250	350	TL	*Betula pubescens*	repeat photography	1976-1997	altitude	stationary	0	0
Pallastunturi, FI	Holtmeier, 2005	68.167	24.000	500	TL	*Picea abies*	repeat photography	1970-1997	altitude	stationary	0	0
Pallastunturi, FI	Holtmeier, Broll, Müterthies, & Anschlag, 2003	68.167	24.000	500–700	FTE	*Picea abies, Pinus sylvestris, Betula pubescens*	stand structure; vitality	1996-2002	altitude	stationary	nd	nd
Ailakkavaara, FI	Holtmeier et al., 2003	69.000	20.928	600–700	FTE	*Betula pubescens*	stand structure; vitality	1996-2002	altitude	stationary	nd	nd
Northern Utsjoki, FI	Holtmeier et al., 2003	69.781	26.963	200–300	FTE	*Pinus sylvestris, Betula pubescens*	stand structure; vitality	1996-2002	altitude	stationary	nd	nd
Kola Peninsula, Russia												
Khibiny-Yumechorr	Mathisen, Mikheeva, Tutubalina, Aune, & Hofgaard, 2014	67.707	33.246	428–445	TL, T	*Pinus sylvestris*	age structure; remote sensing	1958-2008	altitude	advance	27	0.54

Study site	Source	Latitude (N)	Longitude (E)	Elevation, m a.s.l.	Zone	Tree species	Parameters	Period	Context	Behaviour	Recorded change, m	Advance rate, m/year
Khibiny-Tuliok	Aune et al., 2011; Mathisen et al., 2014	67.705	33.783	495–575	TL, T	*Betula pubescens*	age structure; remote sensing	1958-2006	altitude	advance	29	0.6
Kanentiavr	Aune et al., 2011	68.844	34.743	245	TL, T	*Betula pubescens*	age structure	1875-2005	latitude	stationary, retreat	0	0
Kanentiavr	Kravtsova & Loshkareva, 2009; 2010	69.000	34.000	200–290	F, FTE, T	*Betula pubescens*	remote sensing	1961-1984	latitude	stationary	nd	nd
Kanentiavr	Kravtsova & Loshkareva, 2009; 2010	68.758	34.130	260–290	F	*Betula pubescens*	remote sensing	1984-2004	latitude	advance, infilling	nd	nd
Kanentiavr	Kravtsova & Loshkareva, 2009; 2010	68.721	34.401	220–280	FTE	*Betula pubescens*	remote sensing	1984-2004	latitude	advance, infilling	nd	nd
Kanentiavr	Kravtsova & Loshkareva, 2009; 2010	68.930	34.682	200	T	*Betula pubescens*	remote sensing	1984-2004	latitude	advance, infilling	nd	nd
Kanentiavr	Kravtsova & Loshkareva, 2010	68.734	34.249	200–350	F, FTE, T	*Betula pubescens*	remote sensing, ground data	1986-2005	latitude	advance, infilling	nd	nd
North-Central Kola Peninsula	Gervais & MacDonald, 2000	68.413	35.283	150–300	FTE	*Pinus sylvestris*	age structure	20th century	latitude	infilling	nd	nd
Ural region (north of 64 ˚N), Russia												
Engayou-Kerdomanshor	Mazepa & Devi, 2007	66.817	65.533	310	TL	*Larix sibirica*	stand structure	20th century	altitude	infilling	nd	nd
Polar Ural	Shiyatov, 2003	66.000–67.000	65.000–66.000	280	TL	*Larix sibirica*	photographs	1910-2000, 1962-2002	altitude	advance	20–40	0.3
Kerdomanshor River	Shiyatov, Terent'ev, Fomin, & Zimmermann, 2007; Vaganov & Shiyatov, 2005	66.817	65.533	230	FTE	*Larix sibirica*	photographs	1910-2000, 1962-2004	altitude	advance	26	0.3
Rai-Iz massif, Mt. Tchernaya, Mt.Malaya Tchernaya	Shiyatov et al., 2007	66.817	65.533	230	FTE	*Larix sibirica*	mapping	1910-2000	latitude	advance	290	3.2
Rai-Iz massif, Mt. Tchernaya, Mt.Malaya Tchernaya, Mt. Slancevaya,	Shiyatov, Terent'ev, & Fomin, 2005; Shiyatov et al., 2007	66.767–66.917	65.367–65.817	270–560	FTE	*Larix sibirica, Picea obovata*	maps, morphology, age structure	1910-2000	altitude	advance	50	0.5
Polar Ural, Site 1	Wilmking et al., 2012	67.000	59.500	127	FTE	*Picea obovata*	age structure	1700-1990, 1982-2007	altitude	stationary	nd	nd
Polar Ural, Site 2	Wilmking et al., 2012	67.200	62.100	75	FTE	*Picea obovata*	age structure	1830-1990	altitude	stationary	nd	nd

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Polar Ural, Site 3	Wilmking et al., 2012	67.100	62.100	73	FTE	*Picea obovata*	age structure	1650-1980	altitude	stationary	nd	nd
Polar Ural, Site 4	Wilmking et al., 2012	67.400	62.300	85	FTE	*Picea obovata*	age structure	1650-1980	altitude	stationary	nd	nd
More Ju	Esper & Schweingruber, 2004	67.820	60.020	25–50	TL	*Picea obovata*	recruitment pulses	20th century	latitude	advance	nd	nd
Adzva	Esper & Schweingruber, 2004	67.130	60.000	60–90	TL	*Picea obovata*	recruitment pulses	20th century	latitude	advance	nd	nd
Western Siberia (north of 64 ˚N), Russia												
Dudinka	Frost & Epstein, 2014	69.610	86.530	50	FTE	*Larix sp.*	remote sensing	1966-2009	latitude	infilling	nd	nd
Omon-Yuriakh	Budarina, Golubeva, & Silenchuk, 2011; Glukhova, Golubeva, & Kolupanov, 2011	69.407	91.040	230–530	FTE, F	*Larix gmelinii*	age structure	1992-2010	altitude	advance	nd	nd
Yamal Peninsula	Hantemirov, Surkov, & Gorlanova, 2008	67.417–67.583	70.583–70.833	30	FTE	*Larix sibirica*	age structure	1880-2004	latitude	infilling	nd	0
W Norilsk	Esper & Schweingruber, 2004	69.020	83.670	30	TL	*Larix sp.*	recruitment pulses	20th century	latitude	advance	nd	nd
Putorana	Esper & Schweingruber, 2004	70.520	92.950	350	TL	*Larix sp.*	recruitment pulses	20th century	altitude	advance	nd	nd
Bojarska	Esper & Schweingruber, 2004	69.950	97.620	590	TL	*Larix sp.*	recruitment pulses	20th century	altitude	advance	nd	nd
Putorana Mountains	Kirdyanov et al., 2012	70.250	92.750	390	TL	*Larix gmillinii*	age structure	20th century	altitude	advance	30–50	0.4
Eastern Siberia (north of 64 ˚N), Russia												
Anabarskoe	Esper & Schweingruber, 2004	70.870	102.880	220	TL	*Larix sp.*	recruitment pulses	20th century	altitude	advance	nd	nd
Ary-Mas	Budarina et al., 2011; Glukhova et al., 2011	72.492	101.628	18–65	FTE, F	*Larix gmelinii*	age structure	1765-2010	latitude	advance	nd	nd
Ary-Mas	Tyukavina, 2011	72.500	101.800	18–50	FTE, F	*Larix gmelinii*	remote sensing	1973-2002	latitude	advance, infilling	nd	nd
Ary-Mas	Kharuk, Ranson, Im, & Naurzbaev, 2006	72.033–72.667	101.250–102.100	80	FTE	*Larix gmelinii*	remote sensing, radial growth	1973-2000	latitude	advance	nd	3–10
Hatanga	Frost & Epstein, 2014	72.160	102.680	15	FTE	*Larix sp.*	remote sensing	1966-2009	latitude	infilling	nd	nd
Lukunsky	Frost & Epstein, 2014	72.480	105.200	30	FTE	*Larix sp.*	remote sensing	1965-2009	latitude	infilling	nd	nd
Uyandi	Frost & Epstein, 2014	69.450	141.650	300	FTE	*Larix sp.*	remote sensing	1966-2010	latitude	infilling	nd	nd
Kolyma	Frost & Epstein, 2014	68.930	161.360	10	FTE	*Larix sp.*	remote sensing	1965-2010	latitude	retreat	nd	nd

Study site	Source	Latitude (N)	Longitude (E)	Elevation, m a.s.l.	Zone	Tree species	Parameters	Period	Context	Behaviour	Recorded change, m	Advance rate, m/year
Alaska (north of 60 ˚N), US												
Seward Peninsula	Lloyd, Rupp, Fastie, & Starfield, 2002	64.717	-163.967	61–168	FTE	*Picea glauca*	age structure	1880-2000	latitude	advance	10000	83.3
Seward Peninsula (Fox River)	Lloyd, 2005; Lloyd et al., 2002	64.730	-163.880	100	FTE	*Picea glauca*	age structure	1880-2000	altitude	advance	122	1.0
Seward Peninsula (Bear Creek)	Lloyd, 2005; Lloyd et al., 2002	64.870	-163.750	45	FTE	*Picea glauca*	age structure	1740-2000	altitude	stationary	0	0
Noatak National Preserve	Suarez, Binkley, Kaye, & Stottlemyer, 1999	67.467	-162.233	100–170	FTE	*Picea glauca*	age structure	last two centuries	latitude	advance	80–100	0.4–0.5
Noatak National Preserve	Lloyd, 2005; Suarez et al., 1999	67.467	-162.233	160	FTE	*Picea glauca*	age structure	last two centuries	altitude	stationary	0	0
White Mountains (Eagle Summit, Nome Creek, Twelvemile Summit)	Lloyd, 2005; Lloyd & Fastie, 2003	65.400–66.000	-148.800 – -145.400	880–945	FTE	*Picea glauca*	age structure	1880-2000	altitude	advance	30	0.25
Alaska Range (Canyon Creek)	Lloyd, 2005; Lloyd & Fastie, 2003	63.610	-148.680	875	FTE	*Picea glauca*	age structure	1880-2000	altitude	advance	20	0.17
Alaska Range (Monahan Flats)	Lloyd, 2005; Lloyd & Fastie, 2003	63.580	-149.190	885	FTE	*Picea glauca*	age structure	1880-2000	altitude	advance	29	0.24
Alaska Range (Wrangell View)	Lloyd, 2005; Lloyd & Fastie, 2003	63.630	-147.130	895	FTE	*Picea glauca*	age structure	1880-2000	altitude	advance	14	0.12
Kenai Peninsula	Dial, Berg, Timm, McMahon, & Geck, 2007	60.306–60.520	-150 .457 – -150.078	321–1100	TL	*Picea glauca*	air photos & DEMs	1951-1996	altitude	advance	49	1.1
Kenai Peninsula	Dial et al., 2007	60.306–60.520	-150 .457 – -150.078	321–1100	FL	*Picea glauca*	air photos & DEMs	1951-1996	altitude	advance	6	0.1
Alaska Range	Stueve, Isaacs, Tyrrell, & Densmore, 2011	63.500	-150.000	1100	FTE	*Picea glauca, Picea mariana*	remote sensing	1953-2005	altitude	advance, infilling	150	2.9
Western Canada (north of 60oN)												
Inuvik	Walker, Henry, McLeod, & Hofgaard, 2012	68.285	-133.254	7	F	*Picea mariana*	recruitment	1990s-2008	latitude	stationary	0	0
Inuvik-Tuktoyaktuk	Walker et al., 2012	69.153	-131.446	8	FTE	*Picea mariana*	recruitment	1990s-2008	latitude	stationary	0	0
Tuktoyaktuk	Walker et al., 2012	69.380	-132.972	33	T	*Picea mariana*	recruitment	1990s-2008	latitude	stationary	0	0

Study site	Source	Latitude (N)	Longitude (E)	Elevation, m a.s.l.	Zone	Tree species	Parameters	Period	Context	Behaviour	Recorded change, m	Advance rate, m/year
Kluane Range, South-facing 1	Danby & Hik, 2007	61.483	-139.447	1308	F	*Picea glauca*	age structure, stem density	1799-2000s	altitude	advance	65–85	0.7–0.9
Kluane Range, South-facing 1	Danby & Hik, 2007	61.483	-139.450	1383	FTE	*Picea glauca*	age structure, stem density	1895-2000s	altitude	advance	65–85	0.7–0.9
Kluane Range, South-facing 2	Danby & Hik, 2007	61.374	-139.340	1315	F	*Picea glauca*	age structure, stem density	1541-2000s	altitude	advance	65–85	0.7–0.9
Kluane Range, South-facing 2	Danby & Hik, 2007	61.377	-139.346	1404	FTE	*Picea glauca*	age structure, stem density	1747-2000s	altitude	advance	65–85	0.7–0.9
Kluane Range, South-facing 3	Danby & Hik, 2007	61.322	-139.241	1222	F	*Picea glauca*	age structure, stem density	1922-2000s	altitude	advance	65–85	0.7–0.9
Kluane Range, South-facing 3	Danby & Hik, 2007	61.325	-139.248	1256	FTE	*Picea glauca*	age structure, stem density	1854-2000s	altitude	advance	65–85	0.7–0.9
Kluane Range, North-facing 1	Danby & Hik, 2007	61.470	-139.446	1062	F	*Picea glauca*	age structure, stem density	1793-2000s	altitude	infilling	0	0
Kluane Range, North-facing 1	Danby & Hik, 2007	61.469	-139.445	1109	FTE	*Picea glauca*	age structure, stem density	1826-2000s	altitude	infilling	0	0
Kluane Range, North-facing 2	Danby & Hik, 2007	61.363	-139.361	1229	F	*Picea glauca*	age structure, stem density	1711-2000s	altitude	infilling	0	0
Kluane Range, North-facing 2	Danby & Hik, 2007	61.362	-139.357	1264	FTE	*Picea glauca*	age structure, stem density	1657-2000s	altitude	infilling	0	0
Kluane Range, North-facing 3	Danby & Hik, 2007	61.434	-139.511	1216	F	*Picea glauca*	age structure, stem density	1699-2000s	altitude	infilling	0	0
Kluane Range, North-facing 3	Danby & Hik, 2007	61.433	-139.510	1246	FTE	*Picea glauca*	age structure, stem density	1630-2000s	altitude	infilling	0	0
Mackenzie Mtns, WR1	Szeicz & MacDonald, 1995	64.980	-127.610	1010	FTE	*Picea glauca*	age structure, stem density	1785-1990	altitude	infilling	0	0
Mackenzie Mtns, WR2	Szeicz & MacDonald, 1995	64.979	-127.607	970	FTE	*Picea glauca*	age structure, stem density	1784-1990	altitude	infilling	0	0
Mackenzie Mtns, SB1	Szeicz & MacDonald, 1995	64.983	-127.564	880	FTE	*Picea glauca, Larix laricina*	age structure, stem density	1567-1990	altitude	infilling	0	0
Mackenzie Mtns, SB2	Szeicz & MacDonald, 1995	64.986	-127.558	955	FTE	*Picea glauca*	age structure, stem density	1655-1990	altitude	infilling	0	0
Mackenzie Mtns, SB3	Szeicz & MacDonald, 1995	64.983	-127.532	960	FTE	*Picea glauca*	age structure, stem density	1800-1990	altitude	infilling	0	0
Mackenzie Mtns, SB4	Szeicz & MacDonald, 1995	64.974	-127.523	825	FTE	*Picea glauca*	age structure, stem density	1642-1990	altitude	infilling	0	0

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Mackenzie Mtns, SB5	Szeicz & MacDonald, 1995	64.985	-127.563	910	FTE	*Picea glauca*	age structure, stem density	1715-1990	altitude	infilling	0	0
Mackenzie Mtns, LH1	Szeicz & MacDonald, 1995	65.000	-127.544	980	FTE	*Picea glauca*	age structure, stem density	1789-1990	altitude	infilling	0	0
Mackenzie Mtns, LH2	Szeicz & MacDonald, 1995	64.996	-127.553	950	FTE	*Picea glauca*	age structure, stem density	1756-1990	altitude	infilling	0	0
Western Mackenzie Mtns, NWT	Mamet & Kershaw, 2012	63.200	-130.000	1347–1449	FTE	*Abies lasciocarpa, Picea glauca*	age structure	1719-2009	altitude	stationary	0	0
Central Canada (north of 50 ˚N)												
RID, Churchill	Mamet & Kershaw, 2012	58.720	-93.846	19	F	*Picea glauca*	age structure	1735-2008	latitude	advance	nd	nd
RID, Churchill	Mamet & Kershaw, 2012	58.720	-93.845	23	FTE	*Picea glauca*	age structure	1833-2008	latitude	advance	nd	nd
ROK, Churchill	Mamet & Kershaw, 2012	58.729	-93.821	16	F	*Picea glauca*	age structure	1578-2008	latitude	advance	nd	nd
ROK, Churchill	Mamet & Kershaw, 2012	58.728	-93.822	16	FTE	*Picea glauca*	age structure	1850-2008	latitude	advance	nd	nd
BLK, Churchill	Mamet & Kershaw, 2012	58.619	-93.808	34	F	*Picea glauca, Picea mariana, Larix laricina*	age structure	1856-2008	latitude	advance	nd	nd
BLK, Churchill	Mamet & Kershaw, 2012	58.621	-93.808	31	FTE	*Picea glauca, Picea mariana, Larix laricina*	age structure	1919-2008	latitude	advance	nd	nd
Kazan River	MacDonald, Szeicz, Claricoates, & Dale, 1998	62.120–62.350	-99.350 – -98.120	230–280	TL, FL	*Picea glauca, P. mariana*	maps, historical notes, growth pattern	1880-2000	latitude	stationary	0	0
Beech Bay; estuary of the Churchill River	Scott, Hansell, & Fayle, 1987	58.725	-94.133	10	FTE	*Picea glauca*	air photos, age structure	1785-1970s	latitude	advance, infilling	nd	nd
Great Slave Lake, NWT	Masek, 2001	62.000–64.000	-113.000 – -108.000	200–400	FTE	*Picea mariana*	remote sensing - NDVI	1970s-1990s	latitude	stationary	0	0
Eastern Canada (north of 50 ˚N)												
Nunavik, Quebec	Dufour-Tremblay, Lévesque, & Boudreau, 2012	58.707	-65.991	65	TL	*Larix laricina*	age structure	1950s-2010	altitude	advance	nd	nd
Nunavik, Quebec	Dufour-Tremblay et al., 2012	58.707	-65.991	65	TL	*Picea mariana*	age structure	1950s-2010	altitude	stationary	0	0

Study site	Source	Latitude (N)	Longitude (E)	Elevation, m a.s.l.	Zone	Tree species	Parameters	Period	Context	Behaviour	Recorded change, m	Advance rate, m/year
N Quebec	Gamache & Payette, 2005	55.550	-76.510	325	TL	*P.mariana*	tree location and age	1962-1999	altitude	advance	1.7	0.05
N Quebec	Gamache & Payette, 2005	56.220	-75.440	292	TL	*P.mariana*	tree location and age	1916-1999	altitude	advance	6.9	0.1
N Quebec	Gamache & Payette, 2005	57.120	-75.580	232	TL	*P.mariana*	tree location and age	1927-1999	altitude	advance	5.2	0.08
N Quebec	Gamache & Payette, 2005	58.060	-75.490	210	TL	*P.mariana*	tree location and age	1984-1999	altitude	advance	0.2	0.02
Eastern Hudson Bay, Northern Quebec and Nunavut	Caccianiga & Payette, 2006	56.100–56.530	-76.770 – -76.520	5-74	TL	*Picea glauca*	tree location, growth and age	1860s-2000	latitude	advance	nd	nd
Eastern Hudson Bay, Northern Quebec and Nunavut	Caccianiga & Payette, 2006	56.230	-76.750	12	TL	*Picea mariana*	tree location, growth form, age structure	1860s-2000	latitude	stationary	nd	nd
Riviere Boniface, Québec	Lavoie & Payette, 1994	57.780	-76.300	120–145	FL	*Picea mariana*	tree location, growth form, age structure	1880-1990	latitude	advance	4000	36.4
Northern Labrador (site 1)	Payette, 2007	57.920	-62.630	175–300	FTE	*Picea glauca*	stand structure and age	1940s-1990s	altitude	advance	nd	nd
Northern Labrador (site 2)	Payette, 2007	57.370	-62.870	300	TL	*Picea glauca*	stand structure and age	1940s-1990s	altitude	advance	nd	nd
Northern Labrador (site 7)	Payette, 2007	58.200	-62.630	16	TL	*Picea glauca*	stand structure and age	1940s-1990s	altitude	advance	nd	nd
North-eastern Québec (site 3)	Payette, 2007	56.280	-63.550	500	TL	*Picea mariana, Larix laricina*	stand structure and age	1940s-1990s	altitude	stationary	nd	nd
North-eastern Québec (site 4)	Payette, 2007	56.350	-64.570	400	TL	*Picea mariana, Larix laricina*	stand structure and age	1940s-1990s	altitude	stationary	nd	nd
North-eastern Québec (site 5)	Payette, 2007	57.450	-65.200	365–380	TL	*Picea mariana, Larix laricina*	stand structure and age	1940s-1990s	altitude	stationary	nd	nd
North-eastern Québec (site 6)	Payette, 2007	57.850	-65.880	300	TL	*Picea mariana, Larix laricina*	stand structure and age	1940s-1990s	altitude	stationary	nd	nd
East coast of Hudson Bay	Payette & Filion, 1985	56.147	-76.567	10-60	TL	*Picea glauca*	location and age	1880-1980s	altitude	advance	10–30	0.1–0.3
East coast of Hudson Bay	Payette & Filion, 1985	56.306	-76.532	10-60	TL	*Picea glauca*	location and age	1880-1980s	latitude	stationary	0	0
Richmond Gulf, QC	Masek, 2001	55.000–57.000	-78.000 – -74.000	0–300	FTE	*Picea glauca, P. mariana*	remote sensing - NDVI	1970s-1990s	latitude	stationary	0	0

Study site	Source	Latitude (N)	Longitude (E)	Elevation, m a.s.l.	Zone	Tree species	Parameters	Period	Context	Behaviour	Recorded change, m	Advance rate, m/year
Mealy Mts	Simms & Ward, 2013	53.600	-58.830	ca. 800	FTE	*Picea mariana, Picea glauca, Abies balsamea, Larix laricina*	NDVI, imagery change detection	1983-2008	altitude	stationary	0	0
Additional sites close to the Eurasian southern borderline												
Central Swedish Scandes	Kullman & Öberg, 2009	62.025–63.429	11.821–14.359	850–1000	TL	*Betula pubescens*	monitoring	1915-2007	altitude	advance	70–90	0.74
	Kullman & Öberg, 2009	62.025–63.429	11.821–14.359	850–1000	TL	*Picea abies*	monitoring	1915-2007	altitude	advance	70–90	0.98
	Kullman & Öberg, 2009	62.025–63.429	11.821–14.359	850–1000	TL	*Pinus sylvestris*	monitoring	1915-2007	altitude	advance	70–90	0.81
Tylaisko-Konzhakovsko-Serebryanskii Massif, Russia	Kapralov, Shiyatov, Moiseev, & Fomin, 2006	59.583	59.166	900–1000	FTE	*Betula tortuosa*	photographs, maps, stand structure data	1956-2005	altitude	advance, infilling	120	2.4
	Kapralov et al., 2006	59.583	59.166	900–1000	FTE	*Pinus sibirica*	photographs, maps, stand structure data	1956-2005	altitude	advance, stationary abundance	110	2.2
	Kapralov et al., 2006	59.583	59.166	900–1000	FTE	*Picea obovata*	photographs, maps, stand structure data	1956-2005	altitude	advance, decreased abundance	80	1.6
	Kapralov et al., 2006	59.583	59.166	900–1000	FTE	*Larix sibirica*	photographs, maps, stand structure data	1956-2005	altitude	advance, decreased abundance	110	2.2
N-Ural 1, Russia	Esper & Schweingruber, 2004	61.430	59.720	920–950	TL	*Pinus sibirica*	recruitment pulses	20th century	latitude	advance	nd	nd
N-Ural 2, Russia	Esper & Schweingruber, 2004	61.820	59.370	730–800	TL	*Pinus sibirica*	recruitment pulses	20th century	latitude	advance	nd	nd

Footnotes to Supplement S1. Descriptions of data inclusion in each column

Study site: site names as given in the publications.
Source: full bibliographic information is given in the reference list.
Latitude and longitude: coordinates as given in the publications or retrieved from map sources, and translated to a common format. Entries representing landscape sections are given as ranges of latitude and longitude. The datum format is decimal degrees, with east longitudes positive. The assumed datum is WGS84.
Elevation: as given in the publications or retrieved from map sources.
Zone: FTE = forest-tundra ecotone (i.e. transition between forest and the treeless tundra; the term is identical in meaning to the term treeline ecotone). F = open forest section of FTE; FL = forest line (i.e. marked by forest patches or treed areas with <30% tree cover); TL = treeline (i.e. marked by the most advanced >2m tree individuals); T = tundra zone of FTE (i.e. beyond the treeline; has no tree-sized individuals, but has krummholz and/or tree saplings/seedlings). Tree islands belong to either TL or T depending on the height of the stems.
Tree species: as given in the publications.
Parameters: parameter(s) used by the authors of entries in the estimation/calculation of trends and rates.
Period: time period over which the change was observed; or period covered by age structures (periods prior to 1900 were not used).
Behaviour: as given in the publications or deduced from descriptive data.
Context: environmental framing of the study given as altitudinal or latitudinal.
Recorded change: data from monitoring, remote sensing and/or repeat photographs given in the publications.
Advance rate: data given in the publications or calculated from the recorded change information given in the publications (see columns 'Period' and 'Recorded change'). For stationary sites 'nd' or '0' is given depending on the quality of the information. In principle all stationary sites could be shown as '0'; however, this is only used where there is a clear statement or description that can be used to justify it. If the statement is too vague, the rate is shown as 'nd' instead.

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