Table S1 Results from the analysis of variance of linear mixed-effects models. We tested the effect of the factors Snowmelt (levels: Early, Mid, Late), Site (levels: North, South) and Year (levels: 2014, 2015) and their interactions on the timing of vegetative phenophases. The plot from which an observation was made was the random effect. The left-hand column lists the species and phenophases which were analysed and the factor levels which were included in each model. Each model was fitted twice with one of two response variables: either the number of days after snowmelt, or the day of year, when a phenophase occurred for the first time. Non-significant (p>0.05) interactions or main effects were identified by the maximum likelihood ratio test and excluded from the model. For each main effect and each significant interaction, degrees of freedom (in subscript), F-values and p-values are shown.

Phenophase and species	Days after snowmelt				Day of year			
	Snowmelt	Site	Year	Significant interactions	Snowmelt	Site	Year	Significant interactions
Bud green								
Empetrum nigrum								
North-South, Early-Mid, 2014-2015	$F_{1,10}$=16.9615, p=0.0021	$F_{1,10}$=2.7248, n.s.	$F_{1,463}$=837.76, p<.0001	Snowmelt x Site ($F_{1,10}$=5.4217, p=0.0422) Snowmelt x Year ($F_{1,463}$=310.675, p<.0001) Site x Year ($F_{1,463}$=266.7251, p<.0001) Snowmelt x Site x Year ($F_{1,463}$=44.7612, p<.0001)	$F_{1,10}$=68.26, p<.0001	$F_{1,10}$=17.84, p=0.0018	$F_{1,463}$=572.05, p<.0001	Snowmelt x Year ($F_{1,463}$=243.4, p<.0001) Snowmelt x Site x Year ($F_{1,463}$=13.67, p=0.0002)
North, Early-Mid-Late, 2015	$F_{2,7}$=15.0138, p=0.0029)	-	-	-	Could not be tested			
Betula nana	$F_{1,8}$=2.95589, n.s.	$F_{1,8}$=0.0061, n.s.	$F_{1,420}$=1.7709, n.s.	Snowmelt x Year ($F_{1,420}$=109.0079, p<.0001) Site x Year ($F_{1,420}$=131.3763, p<.0001) Snowmelt x Site x Year ($F_{1,420}$=27.4204, p<.0001)	$F_{1,8}$=17.419, p=0.0031)	$F_{1,8}$=3.536, n.s.	$F_{1,420}$=9.348, p=0.0024)	Snowmelt x Year ($F_{1,420}$=17.483, p<.0001) Snowmelt x Site x Year ($F_{1,420}$=17.216, p<.0001)
Salix herbacea								
North-South, 2015	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.
Vaccinium myrtillus								
North-South, Late, 2015	-	n.s.	-	-	-	$F_{1,420}$=17.216, p<.0001)	-	-

Phenophase and species	Days after snowmelt				Day of year			
	Snowmelt	Site	Year	Significant interactions	Snowmelt	Site	Year	Significant interactions
North, Late, 2014-2015	-	-	Could not be tested	-	-	-	$F_{1,93}$=503.21, p<.0001)	-
Vaccinium uliginosum								
South, Early-Mid-Late, 2015	n.s.	-	-	-	Could not be tested			
South, Mid, 2014-2015	Could not be tested				Could not be tested			
North-South, Early, 2015	-	n.s.	n.s.	n.s.	-	n.s.	-	-
North, Early, 2014-2015	Could not be tested				-	-	n.s.	-
Vaccinium vitis-idaea								
North-South, Early-Mid, 2014-2015	$F_{1,11}$=3.07923, n.s.	$F_{1,11}$=0.487, n.s.	$F_{1,213}$=0.1498, n.s.	Snowmelt x Year ($F_{1,213}$=10.617, p=0.0013) Site x Year ($F_{1,213}$=14.8881, p=0.0002) Snowmelt x Site x Year ($F_{1,213}$=8.0036, p=0.0051)	$F_{1,13}$=1.773, n.s.	n.s.	$F_{1,215}$=3.617, n.s.	Snowmelt x Year ($F_{1,215}$=5.445, p=0.0205)
North-South, Early-Mid-Late, 2015	$F_{1,13}$=5.2867, p=0.0209	$F_{1,13}$=5.8442, p=0.0311	-	n.s.	$F_{2,14}$=4.463, p=0.0317	n.s.	-	n.s.
Leaf unfolded								
Empetrum nigrum								
North-South, Early-Mid, 2014-2015	$F_{1,10}$=12.119, p=0.0059	$F_{1,10}$=0.8464, n.s.	$F_{1,444}$=563.9982, p<.0001	Snowmelt x Year ($F_{1,444}$=32.1665, p<.0001) Site x Year ($F_{1,444}$=327.2809, p<.0001) Snowmelt x Site x Year ($F_{1,444}$=38.5027, p<.0001)	$F_{1,10}$=23.47, p=0.0007	$F_{1,10}$=21.44, p=0.0009	$F_{1,442}$=302.19, p<.0001	Snowmelt x Year ($F_{1,442}$=10.48, p=0.0013) Site x Year ($F_{1,442}$=26.88, p<.0001) Snowmelt x Site x Year ($F_{1,442}$=10.35, p=0.0014)
North, Early-Mid-Late, 2015	$F_{2,7}$=35.8791, p=0.0002	-	$F_{1,296}$=206.8937, p<.0001	Snowmelt:Year ($F_{2,296}$=31.6464, p<.0001)	$F_{2,7}$=13.342, p=0.0041	-	$F_{1,296}$=222.621, p<.0001	n.s.
Betula nana	$F_{1,8}$=2.0939, n.s.	$F_{1,8}$=0.2328, n.s.	$F_{1,423}$=342.4571, p<.0001	Snowmelt x Year ($F_{1,423}$=6.2124, p=0.0131) Site x Year ($F_{1,423}$=227.6261, p<.0001)	$F_{1,8}$=31.724, p=0.0005	$F_{1,8}$=5.624, p=0.0451	$F_{1,423}$=212.167, p<.0001	Snowmelt x Year ($F_{1,423}$=108.863, p<.0001) Site x Year ($F_{1,423}$=22.036, p<.0001)

Phenophase and species	Days after snowmelt				Day of year			
	Snowmelt	Site	Year	Significant interactions	Snowmelt	Site	Year	Significant interactions
				Snowmelt x Site x Year ($F_{1,423}$=80.2069, p<.0001)				Snowmelt x Site x Year ($F_{1,423}$=59.76, p<.0001)
Phyllodoce caerulea								
North-South, Late, 2014-2015	-	$F_{1,6}$=5.49, n.s.	$F_{1,221}$=15.8523, p=0.0001)		-	$F_{1,6}$=0, n.s.	$F_{1,220}$=15.14, p=0.0001	Site x Year ($F_{1,220}$=28.92, p<.0001)
South, Mid-Late, 2014-2015	$F_{1,4}$=42.6005, p=0.0028	-	$F_{1,137}$=1.5399, n.s.	Snowmelt:Year ($F_{1,137}$=5.7805, p=0.0175)	$F_{1,4}$=33.31, p=0.0045	-	$F_{1,138}$=65.89, p<.0001	n.s.
Salix herbacea	n.s.	n.s.	n.s.	n.s.	-	$F_{1,3}$=0.945, n.s.	$F_{1,145}$=469.227, p<.0001	Site x Year ($F_{1,145}$=168.354, p<.0001)
Vaccinium myrtillus	-	$F_{1,6}$=8.66, p=0.0259	$F_{1,221}$=104.89, p<.0001	Site x Year ($F_{1,221}$=136.42, p<.0001)	Could not be tested			
V. ulignosum								
South, Early-Mid-Late, 2015	$F_{2,7}$=10.9699, p=0.007	-	-	-	$F_{2,7}$=13.185, p=0.0042	-	-	-
North-South, Early, 2014-2015	Could not be tested				-	$F_{1,5}$=0.3, n.s.	$F_{1,189}$=638.6, p<.0001	Site x Year ($F_{1,189}$=10.8, p=0.0012)
Vaccinium vitis-idaea								
North-South, Early-Mid, 2014-2015	$F_{1,11}$=154.095, p<.0001	$F_{1,11}$=16.227, p=0.002	$F_{1,165}$=31.402, p<.0001	Snowmelt x Site ($F_{1,11}$=7.524, p=0.0191) Snowmelt x Year ($F_{1,165}$=6.709, p=0.0105) Snowmelt x Site x Year ($F_{1,165}$=17.206, p=0.0001)	$F_{1,11}$=0.82, n.s.	$F_{1,11}$=0.15, n.s.	$F_{1,165}$=13.52, p=0.0003	Snowmelt x Site x Year ($F_{1,165}$=4.78, p=0.0301)
North-South, Early-Mid-Late, 2015	$F_{2,11}$=97.3154, p<.0001	$F_{1,11}$=25.5879, p=0.0004	-	Snowmelt x Site ($F_{2,11}$=13.9307, p=0.001)	$F_{2,11}$=10.41, p=0.0029	$F_{1,11}$=4.15, n.s.	-	Snowmelt x Site ($F_{2,11}$=7.2, p=0.01)
Leaf expanded								
Empetrum nigrum								
North-South, Early-Mid, 2014-2015	$F_{1,10}$=35.292, p=0.0001	$F_{1,10}$=10.307, p=0.0093	$F_{1,413}$=2101.243, p<.0001	Snowmelt x Year ($F_{1,413}$=21.693, p<.0001)	$F_{1,10}$=17.45, p=0.0019	$F_{1,10}$=0.01, n.s.	$F_{1,413}$=1704.07, p<.0001	Snowmelt x Year ($F_{1,413}$=6.05, p=0.0143)

Phenophase and species	Days after snowmelt				Day of year			
	Snowmelt	Site	Year	Significant interactions	Snowmelt	Site	Year	Significant interactions
				Site x Year ($F_{1,413}$=166.727, p<.0001) Snowmelt x Site x Year ($F_{1,413}$=20.388, p<.0001)				Snowmelt x Site x Year ($F_{1,413}$=9.52, p=0.0022)
North, Early-Mid-Late, 2015	$F_{2,7}$=100.391, p<.0001	-	$F_{1,294}$=1168.623, p<.0001	Snowmelt x Year ($F_{2,294}$=14.836, p<.0001)	$F_{2,7}$=19.62, p=0.0013	-	$F_{1,294}$=1261.72, p<.0001	Snowmelt x Year ($F_{2,294}$=22.22, p<.0001)
Betula nana	$F_{1,8}$=7.9118, p=0.0227	$F_{1,8}$=1.6067, n.s.	$F_{1,416}$=0.7045, n.s.	Snowmelt x Year ($F_{1,416}$=24.5042, p<.0001) Site x Year ($F_{1,416}$=31.6996, p<.0001) Snowmelt x Site x Year ($F_{1,416}$=13.566, p=0.0003)	$F_{1,8}$=12.11, p=0.0083	$F_{1,8}$=5.55, p=0.0462	$F_{1,416}$=21.75, p<.0001	Snowmelt x Site x Year ($F_{1,416}$=18.18, p<.0001)
Phyllodoce caerulea								
North-South, Late, 2014-2015	-	$F_{1,6}$=1.2439, n.s.	$F_{1,168}$=91.5511, p<.0001	Site x Year ($F_{1,168}$=6.0306, p=0.0151)	-	$F_{1,6}$=0.067, n.s.	$F_{1,168}$=14.497, p=0.0002	Site x Year ($F_{1,168}$=35.041, p<.0001)
South, Mid-Late, 2014-2015	$F_{1,4}$=19.8873, p=0.0112	-	$F_{1,99}$=36.37692, p<.0001	Snowmelt x Year ($F_{1,99}$=3.93967, p=0.0499)	$F_{1,4}$=0.442, n.s.	-	$F_{1,99}$=1.022, n.s.	Snowmelt x Year ($F_{1,99}$=9.704, p=0.0024)
Salix herbacea	-	$F_{1,3}$=5.46, n.s.	$F_{1,196}$=0.28, n.s.	Site x Year ($F_{1,196}$=74.91, p<.0001)	Could not be tested			
Vaccinium myrtillus	Could not be tested				Could not be tested			
Vaccinium uliginosum								
South, Early-Mid-Late, 2015	$F_{2,7}$=11.5842, p=0.006	-	n.s.	n.s.	$F_{2,7}$=12.999, p=0.0044	-	n.s.	n.s.
North-South, Early, 2014-2015	Could not be tested				-	$F_{1,5}$=3.855, n.s.	$F_{1,199}$=13.982, p=0.0002	Site x Year ($F_{1,199}$=80.916, p<.0001)
Vaccinium vitis-idaea								
North-South, Early-Mid, 2014-2015	$F_{1,11}$=70.1505, p<.0001	$F_{1,11}$=26.8237, p=0.0003	$F_{1,156}$=90.9211, p<.0001	Site x Year ($F_{1,156}$=10.5456, p=0.0014)	n.s.	$F_{1,13}$=5.2, p=0.0401	$F_{1,59}$=67.65, p<.0001	n.s.

Phenophase and species	Days after snowmelt				Day of year			
	Snowmelt	Site	Year	Significant interactions	Snowmelt	Site	Year	Significant interactions
				Snowmelt x Site x Year ($F_{1,156}$=4.0498, p=0.0459)				
North-South, Early-Mid-Late, 2015	$F_{2,13}$=35.7584, p<.0001	$F_{1,13}$=21.3631, p=0.0005	-	n.s.	n.s.	n.s.	-	n.s.
Leaf senescence								
Betula nana								
North, Early-Mid, 2014-2015	$F_{1,6}$=84.73, p=0.0001	-	$F_{1,270}$=182.545, p<.0001	n.s.	Could not be tested			
North-South, Mid, 2014-2015	-	$F_{1,4}$=4.0287, n.s.	$F_{1,186}$=18.448, p<.0001	Site x Year ($F_{1,186}$=91.5907, p<.0001)	Could not be tested			
Salix herbacea								
North-South, Late, 2014	Could not be tested				-	n.s.	n.s.	n.s.
Vaccinium myrtillus	-	n.s.	$F_{1,183}$=38.1119, p<.0001	n.s.	-	$F_{1,6}$=0.446, n.s.	$F_{1,182}$=7.229, p=0.0078	Site x Year ($F_{1,182}$=19.459, p<.0001)
Vaccinium uliginosum								
South, Early-Mid-Late,2014-2015	$F_{2,6}$=26.6222, p=0.001	-	$F_{1,182}$=96.2433, p<.0001	Snowmelt x Year ($F_{2,182}$=5.827, p=0.0035)	n.s.	-	*	n.s.

"-" – This term was not part of the analysis

"Could not be tested" – The data did not fulfil the ANOVA assumptions