

1 **Supplementary material 1**

2
 3 Average snow depth (m), average end of snow melt (DOY), soil moisture (% vol) and
 4 nutrient content ($\mu\text{g}/10\text{ cm}^2/\text{day}$) in four plant communities at Zackenberg, NE Greenland in
 5 2005 (plateau, snowbed and heath; n/plant community= 7) and 2010 (Fell-field, n=10).
 6

	Plateau	Snowbed	Heath	Fell-field
Soil moisture	4.0 ± 1.7	34.4 ± 7.8	40.9 ± 11.7	19.8 ± 3.5
Early summer				
Late summer	6.1 ± 2.2	21.8 ± 5.6	32.2 ± 10.5	14.3 ± 2.8
Snow depth (m) - late March ^a	0.7	1.5	1.1	1.6
End of snow melt (DOY)^b	NA	167	163	148
Soil nutrient availability				
NO ₃ -N	0.48 ± 0.12	0.10 ± 0.001	0.11 ± 0.02	0.18 ± 0.13
NH ₄ ⁺ -N	0.11 ± 0.03	0.10 ± 0.04	0.12 ± 0.07	0.01 ± 0.02
PO ₄ ³⁻	0.02 ± 0.01	0.03 ± 0.04	0.01 ± 0.002	0.02 ± 0.01
K ⁺	0.71 ± 0.25	0.66 ± 0.37	0.76 ± 0.22	0.30 ± 0.05
Ca ²⁺	32.56 ± 6.12	25.65 ± 6.65	17.60 ± 8.07	25.50 ± 5.02
Mg ²⁺	7.77 ± 1.20	10.70 ± 3.05	5.74 ± 2.81	3.98 ± 1.00
S ²⁻	2.18 ± 0.18	4.48 ± 2.01	1.90 ± 0.05	1.05 ± 0.40
Fe ³⁺	0.13 ± 0.02	0.43 ± 0.27	0.11 ± 0.02	0.10 ± 0.02

7 ^a Data from Gacitua et al. 2013.

8 ^b Data from Tamstorf et al. 2007.

9

Supplementary material 2. Mean cover of vascular plants (s.e.) measured on the abrasion plateau, the fell-field, the *Cassiope* heath and the *Salix* snowbed communities in 2010 at Zackenberg, NE Greenland. Vegetation cover was assessed within 3 10 m*10 m plots using 30 random 70 cm*70 cm quadrats and Domin-Krajina modified cover classes. * indicates standard error ≤ 0.05

Sites	Plateau n = 3 \bar{x} (s.e.)	Snowbed n = 3 \bar{x} (s.e.)	Heath n = 3 \bar{x} (s.e.)
Asteraceae			
<i>Arnica alpina</i> (L.) Olin			
Brassicaceae			
<i>Draba</i> sp.	$\leq 0.1^*$		$\leq 0.1^*$
<i>Draba arctica</i> J. Vahl	$\leq 0.1^*$		
<i>Draba subcapitata</i> Simm.			
<i>Cardamine bellidifolia</i> L.			$\leq 0.1^*$
Caryophyllaceae			
<i>Arenaria pseudofrigida</i> (Ostenf. & Dahl) Steffen			
<i>Cerastium arcticum</i> Lange			$\leq 0.1^*$
<i>Minuartia rubella</i> (Wahlenb.) Hiern.			
<i>Silene acaulis</i> (L.) Jacq.		0.2*	
<i>Silene sorensenis</i> (Boivin) Bocquet	$\leq 0.1^*$		
<i>Stellaria longipes</i> Goldie		$\leq 0.1^*$	$\leq 0.1^*$
Cyperaceae			
<i>Carex nardina</i> Fr.			
<i>Kobresia myosuroides</i> (Vill.) Fiori	$\leq 0.1^*$		
Ericaceae			
<i>Cassiope tetragona</i> (L.) D. Don		0.2*	62 (9)
<i>Vaccinium uliginosum</i> L.			$\leq 0.1^*$

Supplementary material 2 (continued)

Sites	Plateau n = 3 \bar{x} (s.e.)	Snowbed n = 3 \bar{x} (s.e.)	Heath n = 3 \bar{x} (s.e.)
Juncaceae			
<i>Luzula confusa</i> Lindeb.		0.5 *	0.7*
<i>Luzula nivalis</i> (Laest.) Beurling		$\leq 0.1^*$	$\leq 0.1^*$
Lycopodiaceae			
<i>Huperzia selago</i> (L.) Bernh. Ex Mart. & Schrank			$\leq 0.1^*$
<i>Lycopodium annotinum</i> L.		0.3*	
Orobanchaceae			
<i>Pedicularis hirsuta</i> L.		$\leq 0.1^*$	$\leq 0.1^*$
Papaveraceae			
<i>Papaver radicum</i> Rottb.			$\leq 0.1^*$
Poaceae			
<i>Alopecurus magellanicus</i> Lam.		$\leq 0.1^*$	$\leq 0.1(0.08)$
<i>Anthoxanthum monticola</i> (Bigelow)			$\leq 0.1^*$

Veldkamp			
<i>Arctagrostis latifolia</i> (R. Br.) Griseb.		≤0.1*	0.2*
<i>Festuca vivipara</i> (L.) Sm.			
<i>Poa abbreviata</i> R. Br.	≤0.1*		
<i>Poa arctica</i> R. Br.		0.5(0.2)	≤0.1*
<i>Poa glauca</i> Vahl			
Polygonaceae			
<i>Bistorta vivipara</i> (L.) Delarbre		2 (1.3)	≤0.1*
<i>Oxyria digyna</i> (L.) Hill		≤0.1*	
Rosaceae			
<i>Dryas octopetala</i> L.	0.7 (0.2)	0.9 (0.8)	0.3(0.08)
<i>Potentilla</i> sp.	≤0.1*	≤0.1*	
Supplementary material 2 (continued)			
Sites	Plateau n = 3 \bar{x} (s.e.)	Snowbed n = 3 \bar{x} (s.e.)	Heath n = 3 \bar{x} (s.e.)
Species			
Salicaceae			
<i>Salix arctica</i> Pall.	0.4(0.3)	58 (11)	10 (1.6)
<i>Salix herbacea</i> L.		≤0.1*	
Saxifragaceae			
<i>Saxifraga cernua</i> L.			
<i>Saxifraga oppositifolia</i> L.			
Total plant cover (%)	1*	62 (2)	74 (23)
Species richness	8	16	18