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Weekly to monthly terminus variability of Greenland's marine-terminating outlet glaciers

Taryn E. Black and Ian Joughin

Correspondence to: Taryn E. Black (black.taryn.e@gmail.com)

Supplementary information

1 Supplementary tables

Table S1. List of glaciers digitized at monthly temporal resolution, including their database identification number, ice-sheet region, official name (and alternative common name), and terminus centroid coordinates (degrees latitude, longitude in WGS84). Identification numbers match those in Joughin et al. (2015). Regions listed are central-west (CW), northwest (NW), north (NO), northeast (NE), southeast (SE), and southwest (SW). Glacier names are those designated by Bjørk et al. (2015).

ID	Region	Glacier name	Terminus centroid coordinates
1	CW	Saqqarliup Sermia (Sarqardliup Sermia)	(68.899, -50.319)
2	CW	Alanngorliup Sermia (Alangordliup Sermia)	(68.953, -50.221)
4	CW	Sermeq Avannarleq (Sermeq Avannarleq A)	(69.361, -50.315)
5	CW	Eqip Sermia	(69.793, -50.226)
6	CW	Kangilernata Sermia (Kangilerngata Sermia)	(69.903, -50.341)
8	CW	Sermeq Avannarleq (Sermeq Avangnardleq B)	(70.051, -50.316)
10	CW	Sermeq Avannarleq (Lille Gletsjer)	(70.526, -50.511)
11	CW	Sermilik (Sermilik Isbræ)	(70.630, -50.649)
12	CW	Kangilleq (Kangilleq Kangigdleq Isbræ)	(70.717, -50.668)
14	CW	Perlerfiup Sermia (Perdlerfiup Sermia)	(70.984, -50.874)
15	CW	Kangerluarsuup Sermia (Kangerdluarssup Sermia)	(71.252, -51.485)
16	CW	Kangerlussuup Sermia (Kangerdlugssup Sermerssua)	(71.463, -51.407)
18	NW	Umiammakku Sermiat (Umiammakku Isbræ)	(71.727, -52.409)
25	NW	Naajarsuit Sermiat (Nunatakassaap Sermia)	(73.226, -55.158)
26	NW		(73.373, -55.046)
27	NW	Kakiffaat Sermiat A	(73.453, -55.317)
28	NW	Kakiffaat Sermiat B	(73.483, -55.359)
29	NW	Qeqertarsuup Sermia (Qeqertarssup Sermia)	(73.586, -55.581)
30	NW	Sermeq Kujalleq (Ussingbraer A)	(73.845, -55.618)
31	NW	Sermeq Avanarleq (Ussingbraer B)	(73.943, -55.745)
33	NW		(74.294, -56.093)
36	NW		(74.728, -56.355)
37	NW		(74.789, -56.600)
38	NW		(74.861, -56.773)
39	NW		(74.906, -56.927)
40	NW	Tuttulikassaap Sermia (Hayes Gletsjer)	(74.932, -57.087)
41	NW		(75.019, -57.611)
43	NW		(75.205, -57.731)

ID	Region	Glacier name	Terminus centroid coordinates
44	NW	Sermersuaq (Steenstrup Gletsjer)	(75.285, -57.939)
45	NW	Dietrichson Gletsjer	(75.461, -57.998)
47	NW	Nansen Gletsjer	(75.743, -58.893)
48	NW	Nordenskiöld Gletsjer	(75.839, -59.048)
49	NW		(75.877, -59.186)
50	NW		(75.975, -59.517)
52	NW		(76.070, -59.984)
53	NW		(76.079, -60.151)
54	NW	Issuusarsuit Sermiat (Peary Gletscher)	(76.049, -60.664)
55	NW		(76.191, -60.719)
56	NW	Rink Gletsjer	(76.236, -61.002)
57	NW		(76.237, -61.397)
58	NW	Qeqertat Timaanni Sermeq (Döcker Smith Gletsjer)	(76.252, -61.805)
59	NW	Döcker Smith Gletsjer C	(76.281, -61.893)
60	NW	Döcker Smith Gletsjer B	(76.316, -61.981)
66	NW		(76.357, -64.340)
67	NW		(76.283, -64.616)
68	NW	Helland Gletsjer	(76.193, -64.863)
69	NW	Savissuup Sermia (Savigssuaq Gletscher)	(76.197, -65.244)
70	NW		(76.330, -65.556)
72	NW		(76.257, -67.281)
73	NW		(76.194, -67.485)
74	NW	Paakitsup Sermersua (Pituffik Gletsjer)	(76.232, -68.803)
75	NW	Ullip Sermia (Harald Moltke Bræ)	(76.597, -67.759)
76	NW	Equutissaatsut Sermiat (Knud Rasmussen Gletsjer)	(76.703, -67.960)
77	NW	Naajat Sermiat (Chamberlin Gletsjer)	(76.691, -68.338)
78	NW	Berlingske Glacier	(76.998, -69.638)
79	NW	Leidy Gletsjer	(77.264, -66.111)
80	NW	Qaqujaarsuup Sermia (Heilprin Gletsjer)	(77.538, -66.038)
82	NW	Tuttulipaluup Sermia (Farquhar Gletsjer)	(77.698, -66.249)
83	NW	Paarnarsuit Sermiat (Hart Gletsjer)	(77.684, -67.136)
84	NW	Quinisut Sermiat (Hubbard Gletsjer)	(77.534, -67.832)
85	NW	Kangerluarsuup Sermia (Bowdoin Gletsjer)	(77.679, -68.615)
86	NW	Qinnguata Sermia (Verhoeff Gletsjer)	(77.848, -69.919)
87	NW	Neqip Sermia (Morris Jesup Gletsjer)	(77.887, -71.172)
88	NW	Arfalluarfiup Sermia (Diebitsch Gletsjer)	(77.940, -71.623)
89	NW	Arfalluarfiup Sermia (Clements Markham Gletsjer)	(77.928, -71.983)
92	NO	Sermersuaq (Humboldt Gletsjer)	(79.690, -64.369)

ID	Region	Glacier name	Terminus centroid coordinates
93	NO	Petermann Gletsjer	(80.969, -61.241)
94	NO	Newman Bugt	(81.330, -57.255)
95	NO	Steensby Gletsjer	(81.500, -54.603)
96	NO	Ryder Gletsjer	(81.512, -50.746)
97	NO	Ryder Gletsjer	(81.814, -50.683)
100	NO	Jungersen Gletsjer	(82.117, -42.689)
101	NO		(82.363, -42.007)
102	NO	Adams Gletsjer	(82.257, -40.147)
103	NO	Marie Sophie Gletsjer	(81.783, -32.801)
104	NO	Academy Gletsjer	(81.643, -32.340)
105	NO	Hagen Bræ	(81.439, -27.518)
106	NE	Spaltegletsjer	(79.763, -20.225)
107	NE	Zachariae Isstrøm	(78.896, -20.843)
108	NE	Kofoed-Hansen Bræ	(77.536, -21.792)
109	NE	Bredebræ	(76.706, -22.481)
110	NE	Soranerbræen	(76.208, -21.820)
111	NE	Heinkel Gletsjer	(75.167, -22.482)
112	NE	Waltershausen Gletsjer	(73.806, -24.213)
113	NE	Nunatakgletsjer	(73.947, -25.810)
114	NE	Gerard de Geer Gletsjer	(73.497, -27.250)
115	NE	Jættegletsjer	(73.453, -27.430)
116	NE	Nordenskiöld Gletsjer	(73.134, -27.714)
117	NE	Hisinger Gletsjer	(72.845, -27.435)
118	NE	F. Graae Gletscher	(72.105, -28.693)
119	NE	Charcot Gletscher	(72.051, -28.865)
120	NE	Daugaard-Jensen Gletsjer	(71.912, -28.576)
121	NE	Eielson Gletsjer	(71.130, -27.862)
122	NE	Rolige Bræ	(70.587, -28.273)
123	NE	Døde Bræ	(70.450, -29.115)
124	NE	Vestfjord Gletsjer	(70.390, -29.099)
125	SE		(70.007, -27.973)
126	SE	Kista Dan Gletsjer	(69.965, -27.422)
127	SE	Magga Dan Gletsjer	(69.972, -27.281)
128	SE	Sydbræ	(70.195, -26.306)
141	SE		(68.640, -27.514)
142	SE	Borggraven	(68.619, -28.073)
143	SE		(68.488, -28.474)
144	SE	Kronborg Gletsjer	(68.438, -28.656)

ID	Region	Glacier name	Terminus centroid coordinates
145	SE	Rosenborg Gletsjer	(68.420, -28.817)
146	SE		(68.462, -29.257)
147	SE	Christian IV Gletsjer	(68.405, -30.027)
148	SE	Sorgenfri Gletsjer	(68.296, -30.814)
149	SE	Frederiksborg Gletsjer	(68.274, -31.533)
150	SE	Courtauld Gletsjer	(68.504, -32.208)
151	SE	Styrtegletscher	(68.626, -32.444)
152	SE	Nordfjord Gletsjer	(68.636, -32.584)
153	SE	Kangerlussuaq Gletsjer	(68.601, -32.909)
154	SE		(68.099, -32.041)
155	SE	Apuliliip Apusiia (Polaric Gletsjer)	(67.870, -32.491)
156	SE		(67.843, -32.608)
157	SE		(67.774, -32.732)
158	SE	Søndre Parallelgletsjer	(67.752, -33.360)
159	SE		(67.627, -33.341)
160	SE		(67.569, -33.420)
161	SE	Unartit	(67.428, -33.551)
162	SE		(67.225, -33.741)
163	SE		(66.630, -34.558)
164	SE		(66.575, -34.545)
165	SE	K.J.V. Steenstrup Nordre Bræ	(66.512, -34.527)
166	SE	Sulussuulip Apusiia (K.J.V. Steenstrup Søndre)	(66.473, -34.676)
167	SE	Tuttiliip Kattertarpia (Tuttiliip Kattilersorpia)	(66.372, -34.891)
168	SE	Nigertuluup Kattilertarpia Oqqorteq	(66.375, -35.257)
169	SE	Kattilersorpia (Glacier de France)	(66.446, -35.961)
170	SE	Apuseeq (Knud Rasmussen Gletsjer)	(66.085, -36.327)
171	SE		(66.080, -36.565)
172	SE	Kaarali Gletsjer	(66.095, -36.673)
173	SE	Nigertiip Apusiia (Midgård Gletsjer)	(66.471, -36.690)
174	SE	Apuseerajik (Fenris Gletsjer)	(66.368, -37.546)
175	SE	Helheim Gletsjer	(66.364, -38.171)
176	SE		(65.693, -39.640)
177	SE		(65.621, -39.663)
178	SE		(65.589, -39.930)
179	SE		(65.558, -39.983)
180	SE	Ikertivaq	(65.504, -40.122)
181	SE		(65.193, -40.675)
182	SE		(65.160, -41.136)

ID	Region	Glacier name	Terminus centroid coordinates
183	SE		(64.974, -41.170)
184	SE		(64.875, -41.063)
185	SE		(64.748, -40.804)
186	SE		(64.493, -40.648)
187	SE	Gråulv	(64.328, -41.507)
188	SE		(64.265, -41.569)
189	SE	Sleipner	(63.892, -41.477)
190	SE	A.P. Bernstorff Gletsjer	(63.833, -41.706)
191	SE	Storebjørn	(63.712, -41.660)
192	SE	Apusiigajik (Skinfaxe)	(63.214, -41.839)
193	SE	Rimfaxe	(63.208, -42.170)
194	SE	Heimdal Gletsjer	(62.857, -42.586)
195	SE		(62.761, -43.212)
196	SE		(62.071, -42.455)
197	SE		(61.745, -42.893)
198	SE		(61.690, -42.642)
199	SE		(61.601, -43.094)
200	SE		(61.444, -42.656)
201	SE		(61.326, -43.254)
202	SE		(60.923, -43.468)
203	SW	Eqalorutsit Kangilliit Sermiat (Eqalorutsit Killiit)	(61.311, -45.783)
204	SW	Sermiligaarsuup Sermia (Sermiligaarsuk Bræ)	(61.585, -48.334)
205	SW	Uukkaasorsuaq (Sermilik Bræ)	(61.964, -48.760)
206	SW	Avannarleq Bræ	(62.196, -49.017)
207	SW	Kangiata Nunaata Sermia	(64.304, -49.622)
208	SW	Akullersuup Sermia (Akugdlerssup Sermia)	(64.346, -49.637)
209	SW	Narsap Sermia (Narssap Sermia)	(64.643, -49.975)
210	NO	Ekspedition Bræ	(82.283, -40.323)
211	NE		(79.558, -19.530)
212	NE	Blæsebræ	(78.215, -21.274)
213	NE		(76.855, -22.164)
214	NE		(76.529, -22.398)
215	SE		(68.272, -30.422)
216	SE		(68.560, -32.897)
217	SE		(66.696, -34.302)
218	SE		(65.371, -39.909)
219	SE		(64.726, -40.742)
220	SE		(64.166, -41.512)

ID	Region	Glacier name	Terminus centroid coordinates
221	SE	Gjallerbroen	(63.803, -40.639)
222	SE		(63.711, -40.675)
223	SE	Ydun Gletsjer	(63.690, -40.938)
224	SE	Thrym Gletsjer	(63.565, -41.763)
225	SE		(62.786, -42.730)
226	SE		(62.551, -43.095)
227	SE		(62.491, -43.075)
228	SE		(62.417, -43.003)
229	SE		(62.313, -42.549)
230	SE		(61.925, -42.566)
231	SE		(61.823, -42.775)
232	SE		(61.789, -42.831)
233	SE		(61.511, -42.964)
234	SE		(61.206, -43.214)
235	SE		(60.841, -43.589)
236	SW	Qooqqup Sermia	(61.195, -45.201)
237	NE	Stormgletsjer	(75.657, -22.222)
238	SE		(60.725, -43.801)
239	NE		(70.962, -28.311)

Table S2. List of glaciers digitized at 6 d temporal resolution, including their database identification number, ice-sheet region (central-west, CW, or northwest, NW), official name (and alternative common name), and terminus centroid coordinates (degrees latitude, longitude in WGS84). Identification numbers match those in Joughin et al. (2015). Glacier names are those designated by Bjørk et al. (2015).

ID	Region	Glacier name	Terminus centroid coordinates
3	CW	Sermeq Kujalleq (Jakobshavn Isbræ)	(69.194, -49.651)
7	CW	Sermeq Kujalleq (Alianaatsup Sermia)	(69.999, -50.228)
9	CW	Sermeq Kujalleq (Store Gletsjer)	(70.383, -50.601)
13	CW	Sermeq Silarleq (Sermeq Silardleq)	(70.827, -50.757)
17	CW	Kangilliup Sermia (Rink Isbræ)	(71.736, -51.661)
19	NW	Salliarutsip Sermia (Inngia Isbræ)	(72.065, -52.545)
20	NW		(72.787, -54.233)
21	NW	Sermeq (Upernavik Isstrøm)	(72.848, -54.349)
22	NW		(72.937, -54.282)
23	NW		(73.024, -54.443)
24	NW		(72.999, -54.646)

32	NW	Ikissuup Sermersua (Cornell Gletsjer)	(74.228, -56.082)
34	NW	Illullip Sermia (Igdlugdlip Sermia)	(74.402, -56.092)
35	NW	Nunatakassaap Sermia (Alison Glacier)	(74.605, -56.025)
42	NW	Kjer Gletsjer	(75.132, -57.674)
46	NW	Sverdrup Gletsjer	(75.595, -58.096)
51	NW	Nuussuup Sermia (Kong Oscar Gletsjer)	(75.991, -59.794)
65	NW	Yngvar Nielsen Gletsjer	(76.364, -64.122)
71	NW		(76.313, -66.881)
81	NW	Qeqertaarsuusarsuup Sermia (Tracy Gletsjer)	(77.656, -66.038)

Table S3. Timing and magnitude of terminus-position seasonality for individual glaciers. Regions listed are central-west (CW), northwest (NW), north (NO), northeast (NE), southeast (SE), and southwest (SW). Glaciers that do not show significant terminus position seasonality have "N/A" reported for the timing and magnitude of terminus seasonality. All reported values are medians.

ID	Region	Peak advance	Peak retreat	Retreat duration (days)	Magnitude (m)
1	CW	5 April	10 September	158	170
2	CW	11 March	22 October	225	110
3	CW	16 April	14 August	120	2590
4	CW	8 May	3 September	118	80
5	CW	4 May	8 September	127	290
6	CW	3 June	7 September	96	230
7	CW	22 April	4 September	135	590
8	CW	23 March	3 September	164	180
9	CW	28 April	22 August	116	510
10	CW	5 May	7 December	216	120
11	CW	9 April	6 December	241	210
12	CW	11 March	9 September	182	220
13	CW	24 May	25 January	246	880
14	CW	19 April	7 October	171	40
15	CW	7 May	8 October	154	80
16	CW	5 May	4 October	152	280
17	CW	4 June	22 September	110	810
18	NW	4 April	5 September	154	270
19	NW	31 May	30 October	152	870
20	NW	3 June	5 December	185	180
21	NW	30 May	3 September	96	470
22	NW	5 May	5 December	214	780
23	NW	21 April	7 October	169	270
24	NW	8 March	7 October	213	120

ID	Region	Peak advance	Peak retreat	Retreat duration (days)	Magnitude (m)
25	NW	5 May	26 August	113	170
26	NW	6 May	3 September	120	110
27	NW	N/A	N/A	N/A	N/A
28	NW	6 May	24 September	141	680
29	NW	6 June	6 September	92	200
30	NW	6 June	7 October	123	330
31	NW	4 June	5 September	93	280
32	NW	19 April	20 September	154	320
33	NW	7 April	7 September	153	190
34	NW	17 June	27 October	132	590
35	NW	12 July	11 November	122	1480
36	NW	5 May	25 September	143	220
37	NW	19 June	9 November	143	850
38	NW	4 June	7 October	125	350
39	NW	6 August	5 December	121	270
40	NW	N/A	N/A	N/A	N/A
41	NW	5 April	7 September	155	170
42	NW	22 June	24 November	155	1080
43	NW	N/A	N/A	N/A	N/A
44	NW	20 May	3 October	136	440
45	NW	10 June	6 September	88	420
46	NW	5 July	18 October	105	1720
47	NW	7 April	6 January	274	1090
48	NW	6 July	21 October	107	220
49	NW	6 June	18 September	104	120
50	NW	22 May	4 February	258	200
51	NW	18 June	10 October	114	920
52	NW	6 May	26 August	112	220
53	NW	6 June	8 September	94	160
54	NW	N/A	N/A	N/A	N/A
55	NW	4 July	6 November	125	520
56	NW	20 April	12 September	145	220
57	NW	21 April	7 September	139	160
58	NW	22 June	7 November	138	460
59	NW	N/A	N/A	N/A	N/A
60	NW	20 June	7 October	109	420
65	NW	N/A	N/A	N/A	N/A
66	NW	N/A	N/A	N/A	N/A

ID	Region	Peak advance	Peak retreat	Retreat duration (days)	Magnitude (m)
67	NW	5 June	15 September	102	120
68	NW	24 April	9 September	138	140
69	NW	7 May	24 October	170	90
70	NW	22 May	7 January	230	160
71	NW	18 May	29 October	164	230
72	NW	9 May	8 November	183	220
73	NW	N/A	N/A	N/A	N/A
74	NW	8 May	10 November	186	180
75	NW	N/A	N/A	N/A	N/A
76	NW	7 May	27 September	143	110
77	NW	9 April	9 November	214	50
78	NW	12 May	8 November	180	370
79	NW	10 March	7 October	211	80
80	NW	9 May	10 September	124	370
81	NW	10 July	4 December	147	1020
82	NW	10 March	25 September	199	190
83	NW	23 April	6 October	166	70
84	NW	N/A	N/A	N/A	N/A
85	NW	28 April	22 September	147	110
86	NW	14 March	5 November	236	130
87	NW	6 June	6 October	122	130
88	NW	22 May	8 November	170	110
89	NW	N/A	N/A	N/A	N/A
92	NO	9 May	6 October	150	310
93	NO	N/A	N/A	N/A	N/A
94	NO	N/A	N/A	N/A	N/A
95	NO	N/A	N/A	N/A	N/A
96	NO	22 June	6 September	76	130
97	NO	N/A	N/A	N/A	N/A
100	NO	4 June	5 October	123	180
101	NO	N/A	N/A	N/A	N/A
102	NO	N/A	N/A	N/A	N/A
103	NO	3 June	3 September	92	180
104	NO	3 July	21 September	80	310
105	NO	4 April	6 September	155	220
106	NE	N/A	N/A	N/A	N/A
107	NE	23 June	5 November	135	1760
108	NE	N/A	3 April	N/A	N/A

ID	Region	Peak advance	Peak retreat	Retreat duration (days)	Magnitude (m)
109	NE	N/A	N/A	N/A	N/A
110	NE	5 June	5 October	122	120
111	NE	N/A	N/A	N/A	N/A
112	NE	6 June	4 October	120	120
113	NE	11 May	7 October	149	200
114	NE	5 May	18 September	136	250
115	NE	3 June	18 September	107	180
116	NE	6 May	1 October	148	220
117	NE	6 May	5 October	152	200
118	NE	N/A	N/A	N/A	N/A
119	NE	18 May	3 January	230	180
120	NE	8 April	2 September	147	1330
121	NE	7 April	7 November	214	90
122	NE	25 May	6 November	165	510
123	NE	N/A	N/A	N/A	N/A
124	NE	4 May	4 September	123	290
125	SE	4 June	6 November	155	180
126	SE	5 June	7 November	155	180
127	SE	4 June	5 December	184	70
128	SE	4 June	3 October	121	160
141	SE	4 June	27 January	237	50
142	SE	5 June	24 November	172	300
143	SE	3 July	9 November	129	180
144	SE	6 May	6 November	184	360
145	SE	4 June	7 November	156	440
146	SE	7 May	6 December	213	230
147	SE	6 May	8 October	155	220
148	SE	20 May	7 October	140	160
149	SE	7 May	8 October	154	600
150	SE	4 May	20 September	139	70
151	SE	14 May	6 October	145	220
152	SE	N/A	N/A	N/A	N/A
153	SE	2 July	26 December	177	2650
154	SE	3 June	9 December	189	70
155	SE	12 June	10 November	151	260
156	SE	18 May	4 November	170	290
157	SE	1 July	19 January	202	140
158	SE	15 July	10 November	118	790

ID	Region	Peak advance	Peak retreat	Retreat duration (days)	Magnitude (m)
159	SE	15 July	20 December	158	1720
160	SE	2 June	22 October	142	410
161	SE	11 July	9 December	151	1660
162	SE	4 June	7 December	186	960
163	SE	9 May	4 December	209	160
164	SE	4 May	19 November	199	280
165	SE	5 May	5 December	214	750
166	SE	N/A	N/A	N/A	N/A
167	SE	4 July	4 February	215	150
168	SE	3 May	19 November	200	110
169	SE	N/A	N/A	N/A	N/A
170	SE	14 May	10 November	180	230
171	SE	20 July	2 February	197	60
172	SE	18 May	21 December	217	140
173	SE	4 May	2 October	151	750
174	SE	7 April	10 August	125	620
175	SE	7 April	24 September	170	1480
176	SE	N/A	N/A	N/A	N/A
177	SE	N/A	N/A	N/A	N/A
178	SE	8 June	23 February	260	200
179	SE	6 April	12 August	128	220
180	SE	9 April	13 November	218	680
181	SE	N/A	N/A	N/A	N/A
182	SE	N/A	N/A	N/A	N/A
183	SE	8 May	9 October	154	670
184	SE	23 April	6 October	166	140
185	SE	N/A	N/A	N/A	N/A
186	SE	8 May	9 January	246	210
187	SE	29 May	9 November	164	450
188	SE	N/A	N/A	N/A	N/A
189	SE	25 May	10 November	169	700
190	SE	N/A	N/A	N/A	N/A
191	SE	N/A	N/A	N/A	N/A
192	SE	9 May	10 November	185	220
193	SE	6 April	28 August	144	180
194	SE	10 April	16 August	128	270
195	SE	N/A	N/A	N/A	N/A
196	SE	7 June	23 December	199	310

ID	Region	Peak advance	Peak retreat	Retreat duration (days)	Magnitude (m)
197	SE	8 May	23 December	229	150
198	SE	5 June	8 December	186	190
199	SE	6 September	13 February	160	1270
200	SE	N/A	N/A	N/A	N/A
201	SE	12 May	8 December	210	200
202	SE	8 July	21 January	197	340
203	SW	4 May	8 March	308	100
204	SW	20 April	7 September	140	250
205	SW	4 February	24 August	201	270
206	SW	N/A	N/A	N/A	N/A
207	SW	20 May	18 September	121	540
208	SW	6 May	21 September	138	150
209	SW	22 March	7 September	169	410
210	NO	N/A	N/A	N/A	N/A
211	NE	N/A	N/A	N/A	N/A
212	NE	3 May	6 October	156	140
213	NE	N/A	N/A	N/A	N/A
214	NE	N/A	N/A	N/A	N/A
215	SE	4 July	6 January	186	110
216	SE	6 October	14 January	100	420
217	SE	N/A	N/A	N/A	N/A
218	SE	21 May	23 December	216	300
219	SE	N/A	N/A	N/A	N/A
220	SE	7 April	10 October	186	180
221	SE	7 May	22 September	138	150
222	SE	N/A	N/A	N/A	N/A
223	SE	N/A	N/A	N/A	N/A
224	SE	12 May	24 November	196	50
225	SE	7 June	7 February	245	110
226	SE	11 August	24 March	225	670
227	SE	N/A	N/A	N/A	N/A
228	SE	7 August	8 February	185	880
229	SE	8 May	8 December	214	170
230	SE	25 May	8 January	228	410
231	SE	9 May	24 September	138	220
232	SE	8 June	11 December	186	40
233	SE	N/A	N/A	N/A	N/A
234	SE	8 June	7 December	182	170

ID	Region	Peak advance	Peak retreat	Retreat duration (days)	Magnitude (m)
235	SE	N/A	N/A	N/A	N/A
236	SW	4 April	7 September	156	290
237	NE	3 April	6 October	186	160
238	SE	N/A	N/A	N/A	N/A
239	NE	3 June	23 September	112	160

Table S4. Relationship between glacier seasonal velocity types defined by Vijay et al. (2021), the presence and median magnitude of terminus-position seasonality, and average glacier velocity at the terminus. The numbers presented here are based on 163 out of 219 glaciers in our dataset that we were able to match up with the Vijay et al. (2021) supplementary material based on glacier name and geographic coordinates. In the Seasonal column, the fraction presented is number of seasonal glaciers/number of glaciers in category.

Vijay glacier type	Seasonal	Magnitude (m)	Velocity (m yr^{-1})
Type-2: speeds up and slows down during melt season	21/28	180	696
Type-3: high winter/spring velocities, long slowing period	79/90	250	1324
NA: no classification	27/36	670	2519
Various: mix of 2, 3, and NA	8/9	170	232

Table S5. Relationship between glacier bathymetry types defined by Wood et al. (2021), the presence and median magnitude of terminus-position seasonality, and average glacier velocity at the terminus. The numbers presented here are based on 122 out of 219 glaciers in our dataset that we were able to match up with the Wood et al. (2021) supplementary material based on glacier name and region, because geographic coordinates were not provided. In the Seasonal column, the fraction presented is number of seasonal glaciers/number of glaciers in category.

Wood glacier type	Seasonal	Magnitude (m)	Velocity (m yr^{-1})
CR: terminates and calves on a ridge	20/20	305	2020
DW: terminates in deep fjords with Atlantic Water	30/38	420	1433
FE: terminates in a floating extension	5/8	1480	1279
NC: not categorized, lacking fjord measurements	31/37	180	769
SC: terminates in shallow (<100 m), cold, fresh Polar water	15/15	180	903
SR: already in a state of retreat prior to 1992	4/4	310	825

2 Supplementary figures

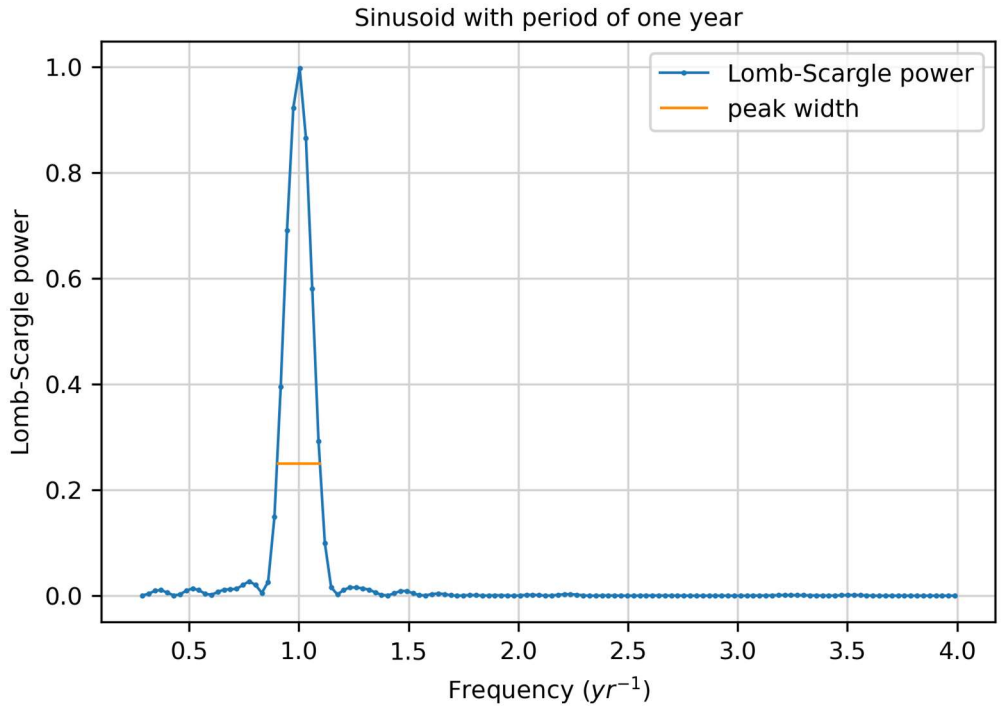

Figure S1. Lomb-Scargle periodogram for a pure sinusoid with a period of one year and a duration of seven years (equivalent to the duration of the glacier terminus data). The width of the peak at one-quarter power is indicated in orange and spans from approximately 0.9 to 1.1 yr^{-1}.

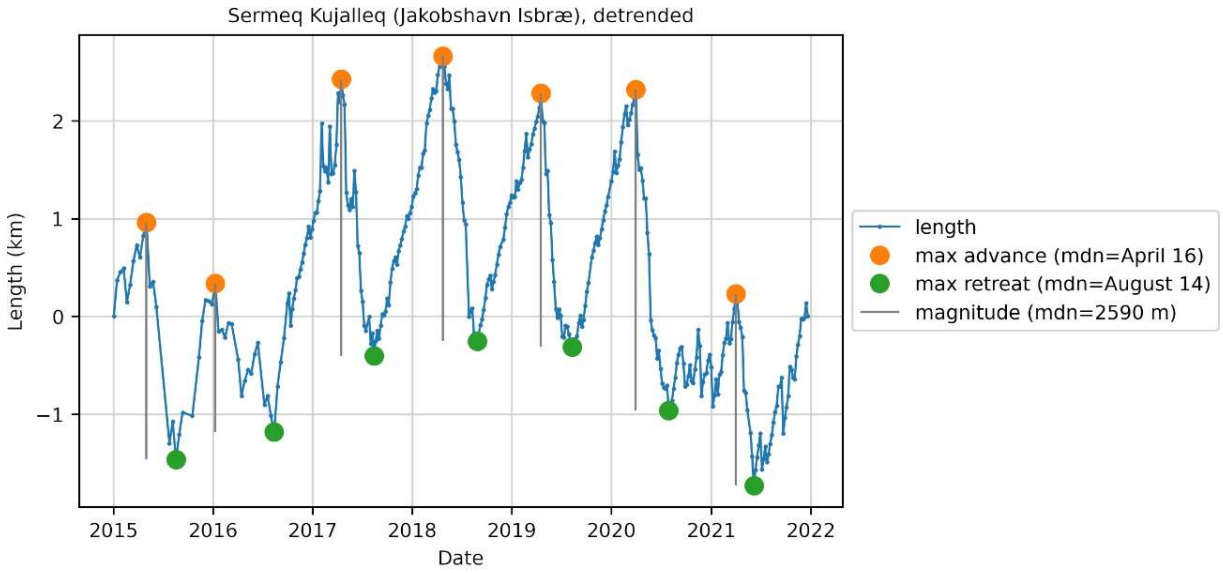

Figure S2. Illustration of the process of determining the annual dates of greatest advance (orange dots) and greatest retreat (green dots) and the annual magnitude of retreat (gray vertical line), demonstrated for Sermeq Kujalleq (Jakobshavn Isbræ, no. 3). The dates of greatest advance and retreat are identified in the original time series, then the time series is detrended and the dates are plotted on the detrended time series. The detrended length at the date of greatest retreat is subtracted from the detrended length at the date of greatest advance to calculate an annual magnitude of retreat. The median dates of greatest advance and retreat and the median magnitude of retreat are reported in the legend.

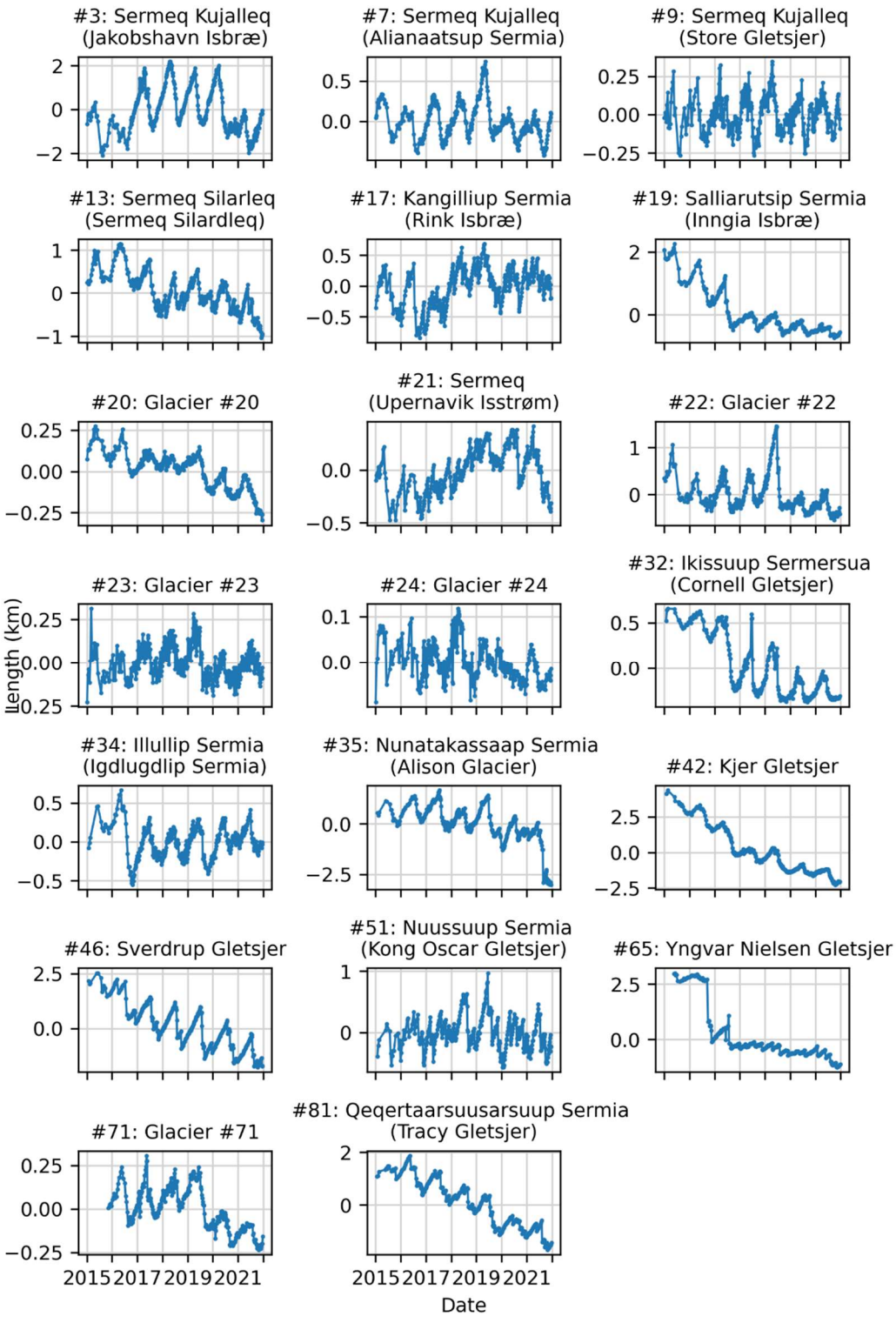

Figure S3. Length time series for the 20 glaciers digitized at 6 d resolution. All lengths are given in kilometers on the y-axis.

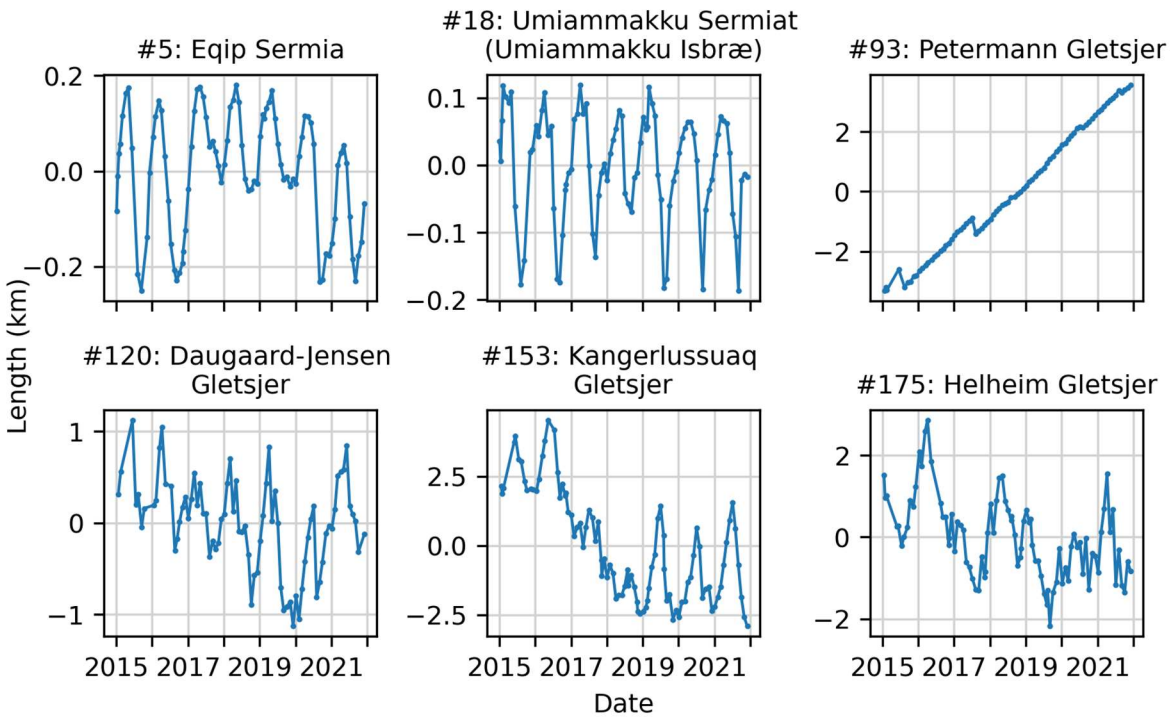

Figure S4. Length time series for selected glaciers digitized at monthly resolution. One glacier from each ice-sheet region is represented. All lengths are given in kilometers on the y-axis.

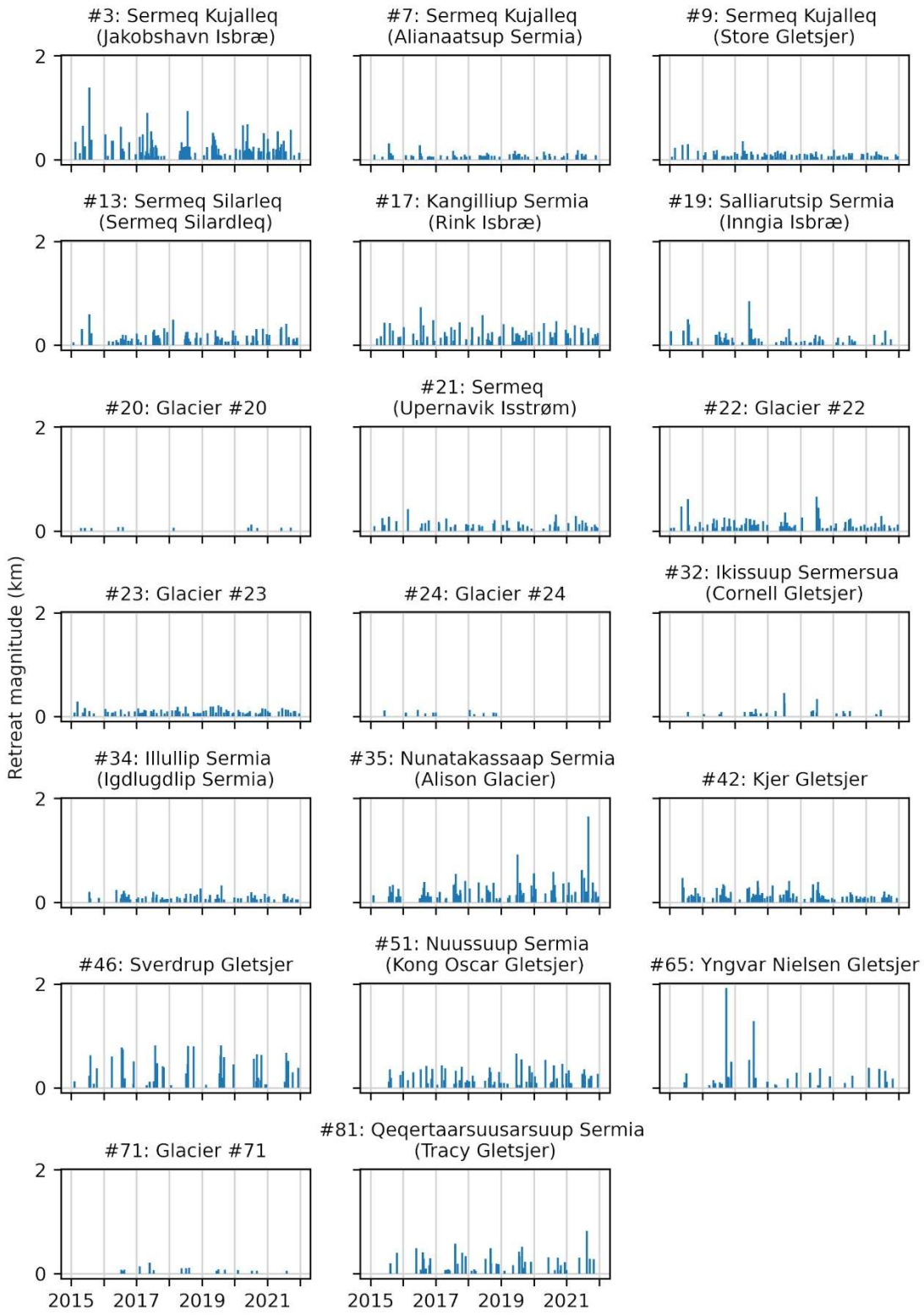

Figure S5. Timing and magnitude of individual retreat events at the 20 weekly glaciers.

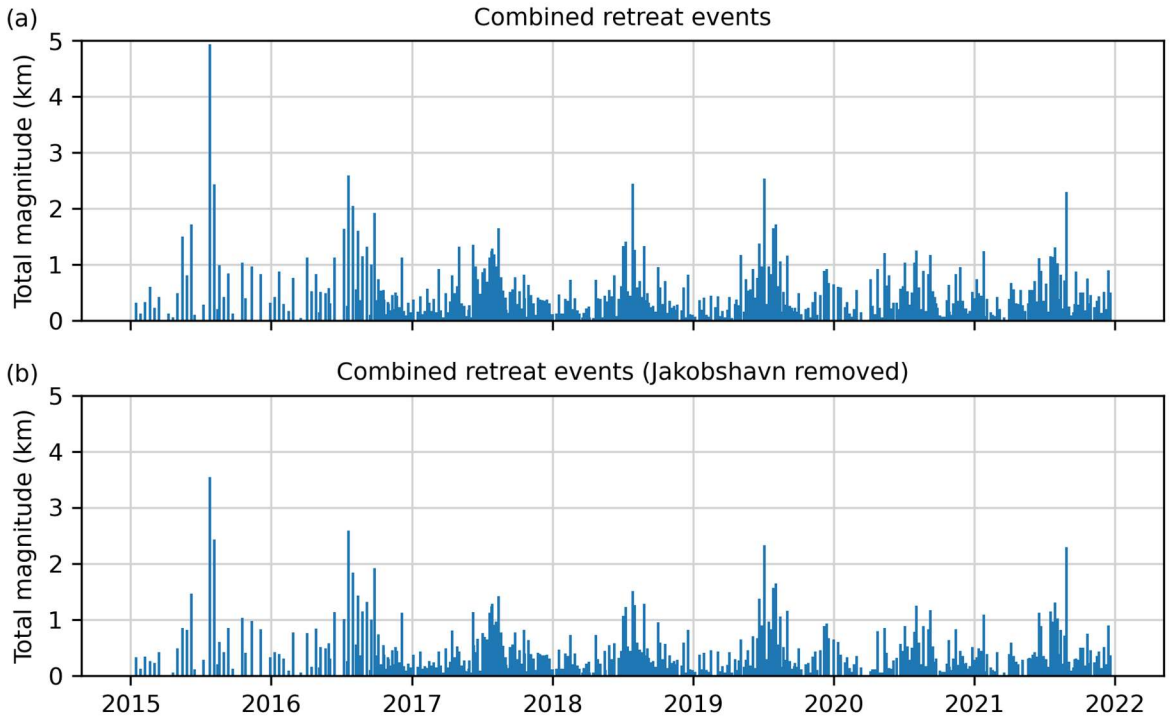

Figure S6. Timing and magnitude of retreat events combined across the 20 weekly glaciers, both (a) with and (b) without Sermeq Kujalleq (Jakobshavn Isbræ, no. 3). If multiple retreat events occur at different glaciers on a single day, their retreat magnitudes are added together. In (b), Jakobshavn is removed to show that it is not solely driving the seasonality in retreat events.