

Supplementary Material

Figure S1: Ice front location extracted from Sentinel-1 images on (a) Petermann Glacier and (b) Nioghalvfjærdsfjorden.

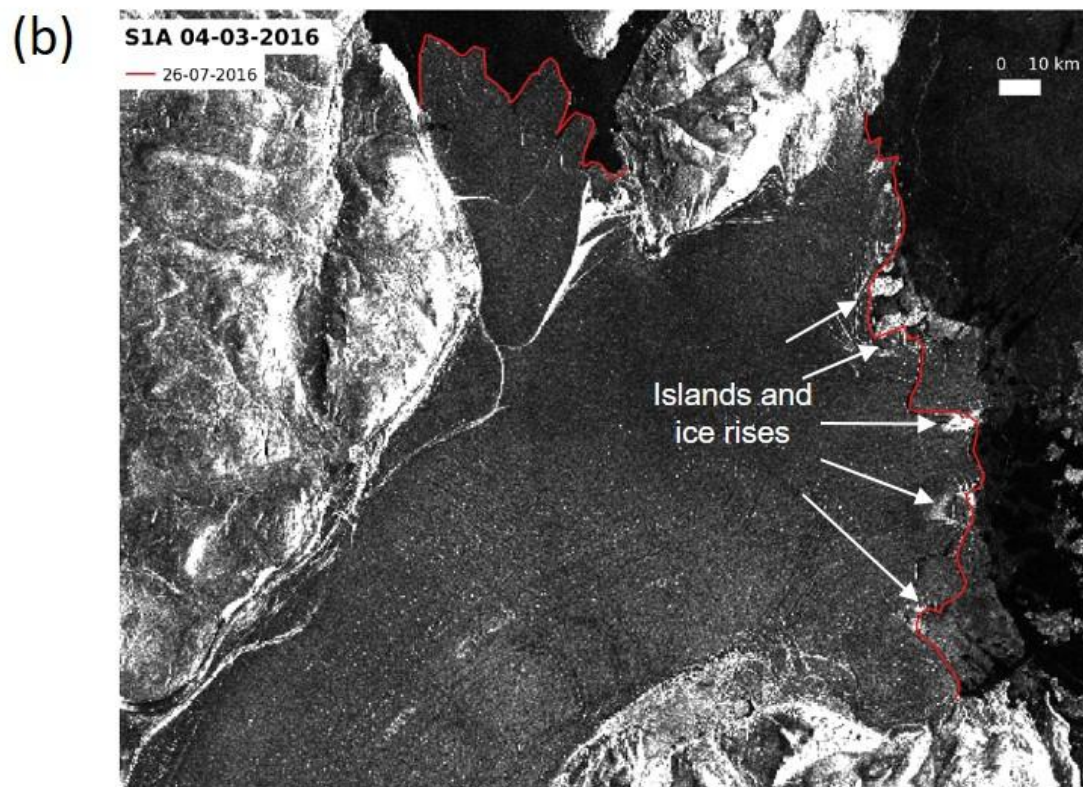
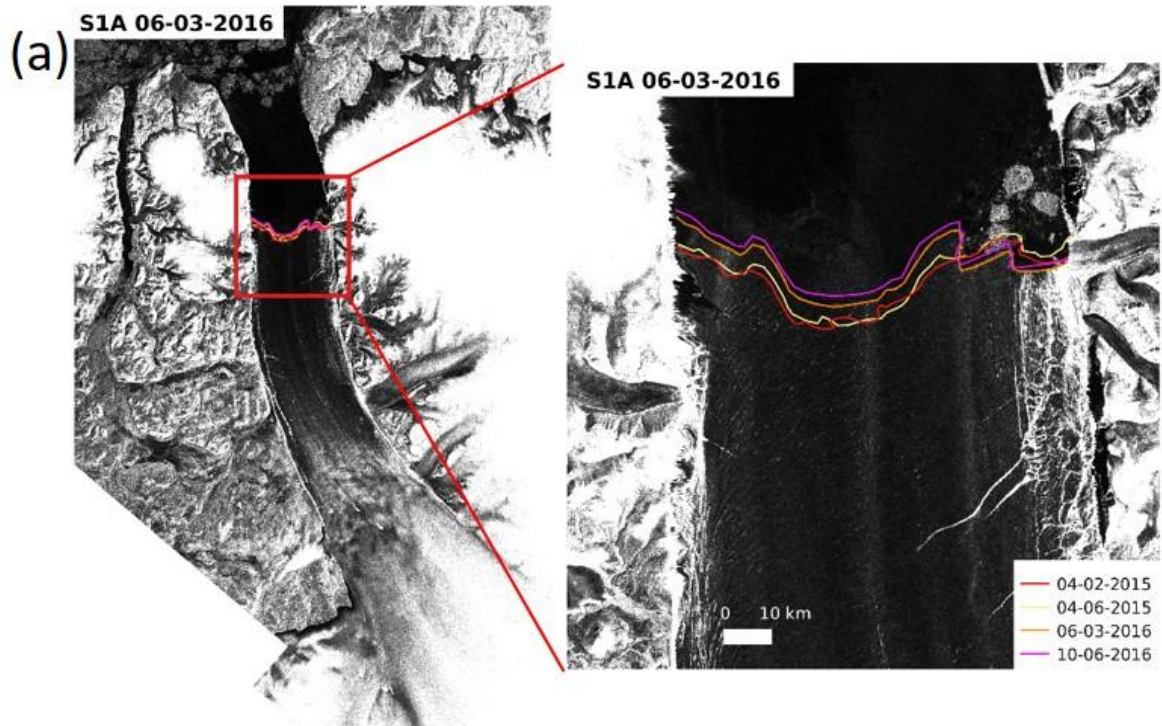


Table S1: List of Sentinel-1 images used.

Glacier	Scene 1				Scene 2			
	Satellite	day	month	year	Satellite	day	month	year
JI	S1A	4	Nov	14	S1A	16	Nov	14
	S1A	16	Nov	14	S1A	28	Nov	14
	S1A	28	Nov	14	S1A	10	Dec	14
	S1A	10	Dec	14	S1A	22	Dec	14
	S1A	22	Dec	14	S1A	3	Jan	15
	S1A	3	Jan	15	S1A	15	Jan	15
	S1A	27	Jan	15	S1A	8	Feb	15
	S1A	8	Feb	15	S1A	20	Feb	15
	S1A	20	Feb	15	S1A	4	Mar	15
	S1A	4	Mar	15	S1A	16	Mar	15
	S1A	16	Mar	15	S1A	28	Mar	15
	S1A	28	Mar	15	S1A	9	Apr	15
	S1A	9	Apr	15	S1A	21	Apr	15
	S1A	21	Apr	15	S1A	3	May	15
	S1A	3	May	15	S1A	15	May	15
	S1A	27	May	15	S1A	8	Jun	15
	S1A	8	Jun	15	S1A	26	Jul	15
	S1A	26	Jul	15	S1A	7	Aug	15
	S1A	7	Aug	15	S1A	19	Aug	15
	S1A	19	Aug	15	S1A	31	Aug	15
	S1A	31	Aug	15	S1A	12	Sep	15
	S1A	12	Sep	15	S1A	24	Sep	15
	S1A	11	Nov	15	S1A	23	Nov	15
	S1A	5	Dec	15	S1A	17	Dec	15
	S1A	17	Dec	15	S1A	29	Dec	15
	S1A	29	Dec	15	S1A	10	Jan	16
	S1A	10	Jan	16	S1A	22	Jan	16
	S1A	22	Jan	16	S1A	3	Feb	16
	S1A	3	Feb	16	S1A	27	Feb	16
	S1A	15	Feb	16	S1A	27	Feb	16
	S1A	27	Feb	16	S1A	10	Mar	16
	S1A	10	Mar	16	S1A	3	Apr	16
	S1A	3	Apr	16	S1A	15	Apr	16
	S1A	15	Apr	16	S1A	27	Apr	16
	S1A	27	Apr	16	S1A	9	May	16
	S1A	27	Apr	16	S1A	21	May	16
	S1A	9	May	16	S1A	21	May	16
	S1A	21	May	16	S1A	2	Jun	16
	S1A	2	Jun	16	S1A	14	Jun	16
	S1A	14	Jun	16	S1A	8	Jul	16
S1A	14	Jun	16	S1A	1	Aug	16	
S1A	20	Jul	16	S1A	1	Aug	16	
S1A	1	Aug	16	S1A	13	Aug	16	
S1A	13	Aug	16	S1A	25	Aug	16	
S1A	25	Aug	16	S1A	6	Sep	16	
S1A	6	Sep	16	S1A	18	Sep	16	
S1A	18	Sep	16	S1A	30	Sep	16	
S1A	30	Sep	16	S1B	6	Oct	16	
S1B	6	Oct	16	S1A	12	Oct	16	

S1A	12	Oct	16	S1B	18	Oct	16
S1B	18	Oct	16	S1A	24	Oct	16
S1A	12	Oct	16	S1B	30	Oct	16
S1A	24	Oct	16	S1B	30	Oct	16
S1B	30	Oct	16	S1A	5	Nov	16
S1B	30	Oct	16	S1B	23	Nov	16
S1A	5	Nov	16	S1B	11	Nov	16
S1B	11	Nov	16	S1A	17	Nov	16
S1A	17	Nov	16	S1B	23	Nov	16
S1B	23	Nov	16	S1A	29	Nov	16
S1A	29	Nov	16	S1B	5	Dec	16
S1B	5	Dec	16	S1A	11	Dec	16
S1A	11	Dec	16	S1B	17	Dec	16
S1B	17	Dec	16	S1A	23	Dec	16
S1B	10	Jan	17	S1A	16	Jan	17
S1A	16	Jan	17	S1B	22	Jan	17
S1B	22	Jan	17	S1A	28	Jan	17
S1A	28	Jan	17	S1B	3	Feb	17
S1B	3	Feb	17	S1A	9	Feb	17
S1A	9	Feb	17	S1B	15	Feb	17
S1B	15	Feb	17	S1A	21	Feb	17

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S1A	23	Jan	15	S1A	4	Feb	15
S1A	4	Feb	15	S1A	16	Feb	15
S1A	23	May	15	S1A	4	Jun	15
S1A	4	Jun	15	S1A	16	Jun	15
S1A	16	Jun	15	S1A	28	Jun	15
S1A	28	Jun	15	S1A	10	Jul	15
S1A	10	Jul	15	S1A	15	Aug	15
S1A	15	Aug	15	S1A	27	Aug	15
S1A	27	Aug	15	S1A	8	Sep	15
S1A	8	Sep	15	S1A	20	Sep	15
S1A	20	Sep	15	S1A	2	Oct	15
S1A	2	Oct	15	S1A	14	Oct	15
S1A	14	Oct	15	S1A	26	Oct	15
S1A	26	Oct	15	S1A	7	Nov	15
S1A	1	Dec	15	S1A	13	Dec	15
S1A	13	Dec	15	S1A	6	Jan	16
S1A	6	Jan	16	S1A	18	Jan	16
S1A	23	Feb	16	S1A	6	Mar	16
S1A	6	Mar	16	S1A	18	Mar	16
S1A	18	Mar	16	S1A	30	Mar	16
S1A	30	Mar	16	S1A	23	Apr	16
S1A	23	Apr	16	S1A	5	May	16
S1A	29	May	16	S1A	10	Jun	16
S1A	10	Jun	16	S1A	4	Jul	16
S1A	4	Jul	16	S1A	28	Jul	16
S1A	28	Jul	16	S1A	9	Aug	16
S1A	9	Aug	16	S1A	2	Sep	16
S1A	2	Sep	16	S1A	14	Sep	16
S1A	14	Sep	16	S1A	26	Sep	16
S1A	26	Sep	16	S1B	2	Oct	16
S1B	2	Oct	16	S1A	8	Oct	16
S1A	8	Oct	16	S1B	14	Oct	16
S1B	14	Oct	16	S1B	7	Nov	16

S1B	7	Nov	16	S1A	13	Nov	16
S1A	13	Nov	16	S1B	1	Dec	16
S1B	1	Dec	16	S1A	7	Dec	16
S1A	7	Dec	16	S1B	13	Dec	16
S1B	13	Dec	16	S1A	19	Dec	16
S1A	19	Dec	16	S1B	25	Dec	16
S1B	25	Dec	16	S1A	31	Dec	16
S1A	31	Dec	16	S1B	6	Jan	17
S1B	6	Jan	17	S1A	12	Jan	17
S1A	12	Jan	17	S1B	30	Jan	17
S1B	30	Jan	17	S1A	5	Feb	17
S1A	5	Feb	17	S1B	11	Feb	17
S1B	11	Feb	17	S1A	17	Feb	17

S1A	6	Aug	15	S1A	30	Aug	15
S1A	30	Aug	15	S1A	11	Sep	15
S1A	11	Sep	15	S1A	23	Sep	15
S1A	23	Sep	15	S1A	5	Oct	15
S1A	5	Oct	15	S1A	10	Nov	15
S1A	4	Dec	15	S1A	16	Dec	15
S1A	16	Dec	15	S1A	28	Dec	15
S1A	28	Dec	15	S1A	9	Jan	16
S1A	9	Jan	16	S1A	21	Jan	16
S1A	21	Jan	16	S1A	2	Feb	16
S1A	2	Feb	16	S1A	26	Feb	16
S1A	26	Feb	16	S1A	9	Mar	16
S1A	9	Mar	16	S1A	2	Apr	16
S1A	2	Apr	16	S1A	14	Apr	16
S1A	14	Apr	16	S1A	8	May	16
S1A	8	May	16	S1A	20	May	16
S1A	20	May	16	S1A	1	Jun	16
S1A	1	Jun	16	S1A	13	Jun	16
S1A	13	Jun	16	S1A	19	Jul	16
S1A	19	Jul	16	S1A	31	Jul	16
S1A	31	Jul	16	S1A	12	Aug	16
S1A	12	Aug	16	S1A	24	Aug	16
S1A	24	Aug	16	S1A	5	Sep	16
S1A	5	Sep	16	S1B	5	Oct	16
S1B	5	Oct	16	S1A	11	Oct	16
S1A	11	Oct	16	S1A	23	Oct	16
S1A	23	Oct	16	S1B	4	Dec	16
S1B	4	Dec	16	S1B	16	Dec	16
S1B	16	Dec	16	S1B	28	Dec	16
S1B	28	Dec	16	S1A	3	Jan	17
S1A	3	Jan	17	S1B	9	Jan	17
S1B	9	Jan	17	S1B	21	Jan	17
S1B	21	Jan	17	S1B	2	Feb	17
S1B	2	Feb	17	S1A	8	Feb	17
S1A	8	Feb	17	S1B	14	Feb	17

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ZI

- Table S2: Velocity magnitude differences of JI using surface elevation rate of change information derived from IceBridge and Pre-Icebridge data acquired from the NASA Airborne Topographic Mapper (ATM) [Studinger, 2014] for terrain correction, and velocity magnitude without using thinning correction.

Difference [m/yr]	Distance along the profile from the grounding line [km]								
	0 - 5	5 - 10	10 - 15	15 - 20	20 - 25	25 - 30	30 - 35	35 - 40	40 - 45
Mean	-65.7	-18.1	-12.4	-2.9	3.0	-3.8	0.9	1.9	1.9
Max	55.8	58.6	33.2	9.9	37.6	36.9	13.1	16.0	20.2
Min	-277.3	-160.4	-75.3	-17.2	-32.8	-39.3	-11.8	-6.0	-6.6