

# Supplementary Material

Table S1 List of Sentinel-1 scenes used for training and testing.

		Scenes for training the U-Net	Scenes for testing the U-Net
Training Sites	Sulzberger	S1A_EW_GRDM_1SDH_20170620T075239_20170620T075343_017114_01C880_C5D4 S1A_EW_GRDM_1SDH_20170702T075239_20170702T075344_017289_01CDC5_1356 S1A_EW_GRDM_1SDH_20170819T075242_20170819T075346_017989_01E30D_C9BA S1A_EW_GRDM_1SDH_20170831T075243_20170831T075347_018164_01E850_A2F4 S1A_EW_GRDM_1SDH_20170924T075243_20170924T075348_018514_01F328_FA7C S1A_EW_GRDM_1SDH_20171123T075243_20171123T075348_019389_020E13_4025 S1A_EW_GRDM_1SDH_20180110T075242_20180110T075346_020089_0223F3_0C85 S1A_EW_GRDM_1SDH_20180215T075241_20180215T075345_020614_0234AE_6D81 S1A_EW_GRDM_1SDH_20180323T075241_20180323T075345_021139_024553_900B S1A_EW_GRDM_1SDH_20180428T075242_20180428T075346_021664_0255C7_E341 S1A_EW_GRDM_1SDH_20180522T075243_20180522T075348_022014_0260EA_48FA S1A_EW_GRDM_1SDH_20180719T080901_20180719T081005_022860_027A9B_60B6 S1A_EW_GRDM_1SDH_20180812T080902_20180812T081006_023210_0285B7_434F S1A_EW_GRDM_1SDH_20181130T075250_20181130T075354_024814_02BB4F_3171 S1A_EW_GRDM_1SDH_20190103T080902_20190103T081006_025310_02CCE0_4C0D S1A_EW_GRDM_1SDH_20190127T080901_20190127T081006_025660_02D99C_5A32 S1A_EW_GRDM_1SDH_20190220T080901_20190220T081005_026010_02E61C_1763 S1A_EW_GRDM_1SDH_20190304T080901_20190304T081005_026185_02EC63_D471 S1A_EW_GRDM_1SDH_20190409T080901_20190409T081006_026710_02FFAD_30DA S1B_EW_GRDM_1SDH_20170521T075155_20170521T075259_005693_009F96_5940	S1A_EW_GRDM_1SDH_20180620T080051_20180620T080155_022437_026E14_C3B3 S1A_EW_GRDM_1SDH_20180623T064732_20180623T064836_022480_026F4A_EC15
	Victoria	S1A_EW_GRDM_1SDH_20180516T102148_20180516T102216_021928_025E20_3546 S1A_EW_GRDM_1SDH_20181107T101350_20181107T101421_024480_02AF23_E5E0 S1B_EW_GRDM_1SDH_20170719T102912_20170719T102934_006555_00B874_63DE S1B_EW_GRDM_1SDH_20170910T103720_20170910T103739_007328_00CED9_9010 S1B_EW_GRDM_1SDH_20180821T101302_20180821T101335_012359_016C94_280A S1B_EW_GRDM_1SDH_20181231T101302_20181231T101335_014284_01A92C_EAB3	S1B_EW_GRDM_1SDH_20180629T100454_20180629T100526_011586_0154CB_CD19 S1B_EW_GRDM_1SDH_20180620T102912_20180620T102939_011455_0150B6_292C
	Wilkes	S1A_EW_GRDM_1SDH_20171126T113841_20171126T113946_019435_020F86_F6C6 S1A_EW_GRDM_1SDH_20180218T113839_20180218T113943_020660_02361F_FF87 S1A_EW_GRDM_1SDH_20180829T113847_20180829T113952_023460_028DC0_B232 S1A_EW_GRDM_1SDH_20181215T113847_20181215T113951_025035_02C2FC_04B7 S1B_EW_GRDM_1SDH_20180730T113804_20180730T113908_012039_0162AB_B608 S1B_EW_GRDM_1SDH_20180928T113806_20180928T113910_012914_017DA0_7CC3	S1A_EW_GRDM_1SDH_20180618T113843_20180618T113934_022410_026D43_A538

Test Sites	Shackleton	S1A_EW_GRDM_1SDH_20170722T132553_20170722T132657_017584_01D6A9_5238 S1A_EW_GRDM_1SDH_20170920T132556_20170920T132700_018459_01F15A_7E2D S1A_EW_GRDM_1SDH_20171119T132556_20171119T132700_019334_020C46_6E90 S1A_EW_GRDM_1SDH_20180331T132553_20180331T132658_021259_024912_8601 S1A_EW_GRDM_1SDH_20180530T132556_20180530T132700_022134_0264B6_96F8 S1A_EW_GRDM_1SDH_20190218T132600_20190218T132704_025984_02E526_D0D7	S1A_EW_GRDM_1SDH_20180623T132558_20180623T132702_022484_026F6A_DD3E
	Marie Byrd		S1A_EW_GRDM_1SDH_20180618T050038_20180618T050143_022406_026D25_2F9A S1A_EW_GRDM_1SDH_20180619T054206_20180619T054310_022421_026DA1_B299
	Wordie		S1A_EW_GRDM_1SDH_20180611T081911_20180611T081941_022306_026A14_C45F
	Ekstornisen		S1B_EW_GRDM_1SDH_20180626T211218_20180626T211323_011549_0153A9_120B
	Oats Land		S1B_EW_GRDM_1SDH_20180626T094138_20180626T094238_011542_01536C_EB6F

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Table S2 Scenes used to create the calving front time-series for Getz ice shelf.

No.	Scene
1	S1B_EW_GRDM_1SDH_20170520T053252_20170520T053357_005677_009F1F_1587
2	S1A_EW_GRDM_1SDH_20180708T053343_20180708T053450_022698_0275A8_20C7
3	S1A_EW_GRDM_1SDH_20180614T053342_20180614T053449_022348_026B6A_3619
4	S1A_EW_GRDM_1SDH_20180509T053340_20180509T053444_021823_025AD0_CD69
5	S1A_EW_GRDM_1SDH_20180403T053338_20180403T053443_021298_024A59_A3A0
6	S1A_EW_GRDM_1SDH_20180310T053338_20180310T053442_020948_023F41_7D47
7	S1A_EW_GRDM_1SDH_20180202T053338_20180202T053443_020423_022E8F_1B56
8	S1A_EW_GRDM_1SDH_20180109T053339_20180109T053443_020073_02236D_FA92
9	S1A_EW_GRDM_1SDH_20171204T053340_20171204T053445_019548_02130B_411D
10	S1A_EW_GRDM_1SDH_20171110T053341_20171110T053445_019198_02080C_EFC9
11	S1A_EW_GRDM_1SDH_20171005T053341_20171005T053445_018673_01F7FB_404D
12	S1A_EW_GRDM_1SDH_20170911T053340_20170911T053445_018323_01ED47_EEC8
13	S1A_EW_GRDM_1SDH_20170806T053339_20170806T053443_017798_01DD3B_2024
14	S1A_EW_GRDM_1SDH_20170701T053337_20170701T053441_017273_01CD41_830F
15	S1A_EW_GRDM_1SDH_20170607T053336_20170607T053440_016923_01C293_750C

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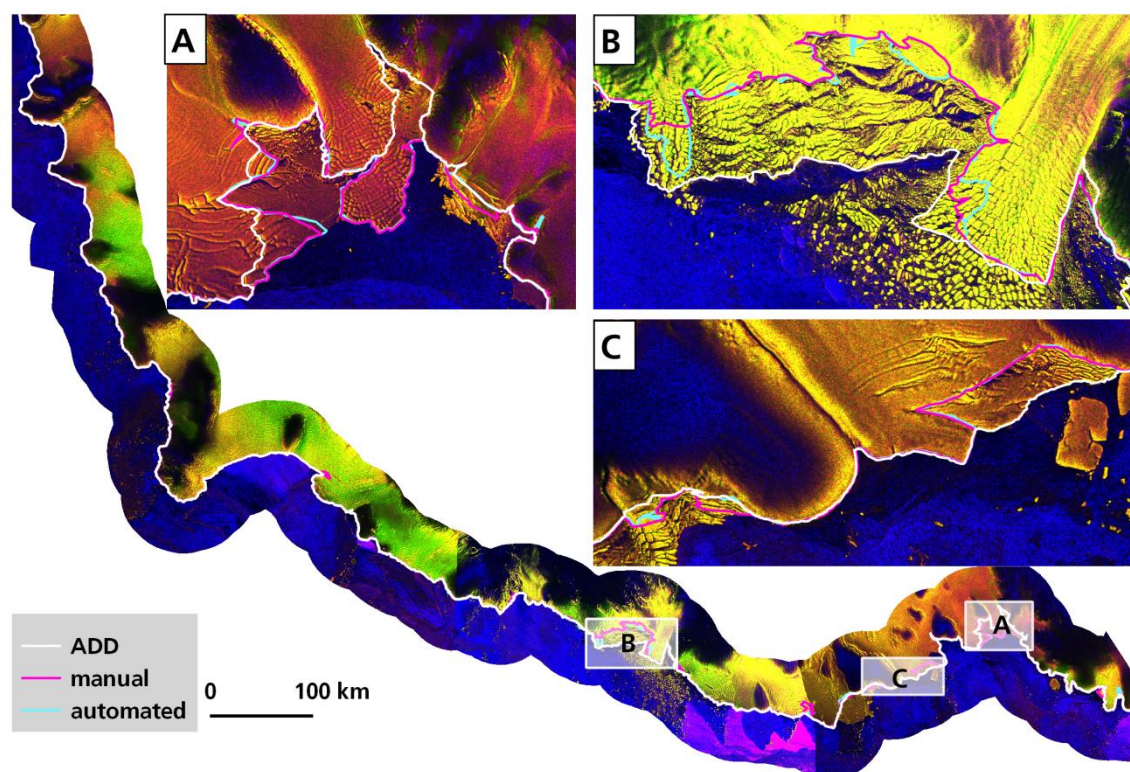


Figure S1 Comparison of the extracted coastline along Marie Byrd Land with a manual reference and the ADD coastline for June 2018. Figures A to C show magnifications of coastal sections with major deviations. Background: Sentinel-1 scenes between 18<sup>th</sup> and 23<sup>rd</sup> of June 2018.

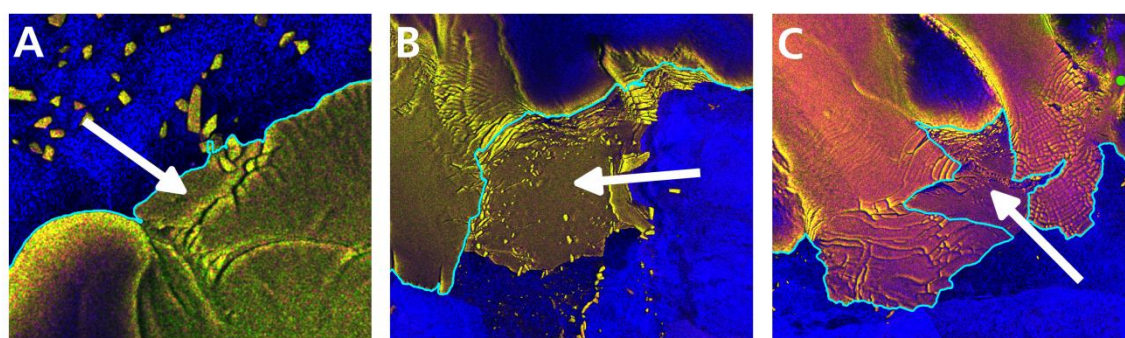


Figure S2 Three examples of fast ice areas (indicated with white arrow) with very similar backscatter characteristics to glacier ice. The turquoise line indicates the automatically extracted coastline. Image A is at the front of Ekstromisen ice shelf where the fast ice was not detected. B & C at Nickerson and Sulzberger ice shelf with well recognized fast ice areas. Background: Sentinel-1 imagery, June 2018.