Supplements of

An Arctic sea ice concentration data record on a 6.25 km polar stereographic grid from three-years' Landsat-8 imagery

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S1 Evaluation of Ice And Open Water Classification Over Clear Pixels
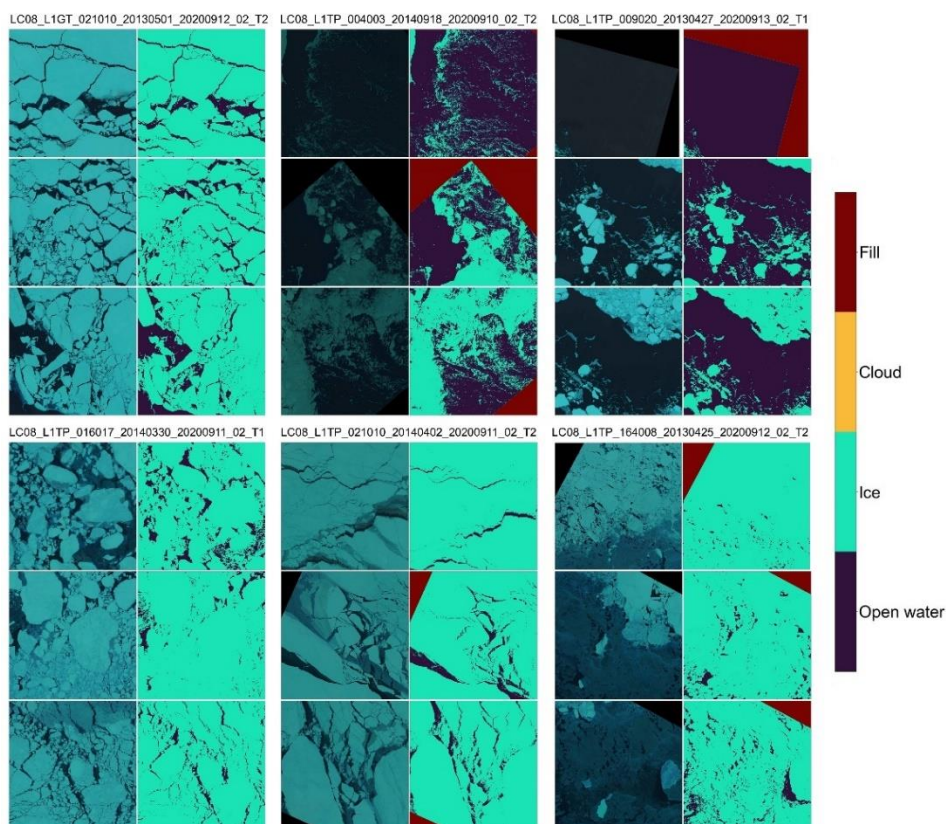
Figure S1: Sub-sections of the 6 scenes used for the test of ice and open water classification over clear pixels. True-color images (right of each panel) and the reference classification map (left of each panel) are provided. Each pixel in the scene belong to open water (dark purple), ice (mint), or cloud (yellow). Red colour indicates the fill values. The true-color images were downloaded from United States Geological Survey Earth Explorer (https://earthexplorer.usgs.gov/, last access: May 22, 2024).

Year	Filename
2013	LC08_L1GT_021010_20130501_20200912_02_T2 LC08_L1TP_009020_20130427_20200913_02_T1 LC08_L1TP_164008_20130425_20200912_02_T2
2014	LC08_L1TP_004003_20140918_20200910_02_T2 LC08_L1TP_016017_20140330_20200911_02_T1 LC08_L1TP_021010_20140402_20200911_02_T2

15   **Table S1: List of Landsat-8 scenes used to test the performance of ice and open water classification over clear pixels.**

S2 Evaluation of Landsat-8 SIC Using Ice Chart

Cloud contamination label	Region	Filename (Landsat)	Filename (Ice chart)	Time Difference [sec]
C1	Barents_Sea	LC08_L1TP_221244_20210430_20210508_02_T2	ice_conc_svalbard_202104301500.nc	1397
	Barents_Sea	LC08_L1TP_226243_20210503_20210508_02_T2	ice_conc_svalbard_202105031500.nc	3225
	Barents_Sea	LC08_L1GT_222242_20210507_20210517_02_T2	ice_conc_svalbard_202105071500.nc	1717
	Barents_Sea	LC08_L1TP_214243_20210803_20210811_02_T1	ice_conc_svalbard_202108031500.nc	-1191
	Barents_Sea	LC08_L1TP_221242_20210804_20210811_02_T1	ice_conc_svalbard_202108041500.nc	1381
	Barents_Sea	LC08_L1TP_214245_20220518_20220525_02_T2	ice_conc_svalbard_202205181500.nc	-1151
	Barents_Sea	LC08_L1TP_225243_20220718_20220726_02_T1	ice_conc_svalbard_202207181500.nc	2899
	East_Greenland_Sea	LC08_L1TP_229012_20210305_20210312_02_T1	ice_conc_svalbard_202103051500.nc	-1164
	East_Greenland_Sea	LC08_L1TP_225011_20210309_20210317_02_T1	ice_conc_svalbard_202103091500.nc	-2673
	East_Greenland_Sea	LC08_L1TP_224011_20210318_20210328_02_T2	ice_conc_svalbard_202103181500.nc	-3049
	East_Greenland_Sea	LC08_L1TP_227011_20210323_20210402_02_T1	ice_conc_svalbard_202103231500.nc	-1937
	East_Greenland_Sea	LC08_L1TP_225010_20210325_20210402_02_T2	ice_conc_svalbard_202103251500.nc	-2703
	East_Greenland_Sea	LC08_L1TP_003005_20210407_20210415_02_T1	ice_conc_svalbard_202104071500.nc	1253
	East_Greenland_Sea	LC08_L1TP_227008_20210408_20210416_02_T2	ice_conc_svalbard_202104081500.nc	-2013
	East_Greenland_Sea	LC08_L1TP_001004_20210409_20210416_02_T2	ice_conc_svalbard_202104091500.nc	486
	East_Greenland_Sea	LC08_L1TP_006004_20210412_20210423_02_T1	ice_conc_svalbard_202104121500.nc	2339
	East_Greenland_Sea	LC08_L1TP_230006_20210413_20210423_02_T1	ice_conc_svalbard_202104131500.nc	-951
	East_Greenland_Sea	LC08_L1TP_004004_20210414_20210423_02_T2	ice_conc_svalbard_202104141500.nc	1597
	East_Greenland_Sea	LC08_L1TP_228007_20210415_20210424_02_T1	ice_conc_svalbard_202104151500.nc	-1669
	East_Greenland_Sea	LC08_L1TP_005004_20210421_20210430_02_T1	ice_conc_svalbard_202104211500.nc	1964
	East_Greenland_Sea	LC08_L1TP_008003_20210426_20210501_02_T1	ice_conc_svalbard_202104261500.nc	3050
	East_Greenland_Sea	LC08_L1TP_004003_20210430_20210508_02_T1	ice_conc_svalbard_202104301500.nc	1564
	East_Greenland_Sea	LC08_L1TP_007004_20210505_20210517_02_T1	ice_conc_svalbard_202105051500.nc	2697
	East_Greenland_Sea	LC08_L1TP_005004_20210507_20210517_02_T1	ice_conc_svalbard_202105071500.nc	1955
	East_Greenland_Sea	LC08_L1TP_225011_20210512_20210524_02_T1	ice_conc_svalbard_202105121500.nc	-2695
	East_Greenland_Sea	LC08_L1TP_002004_20210518_20210528_02_T1	ice_conc_svalbard_202105181500.nc	851
	East_Greenland_Sea	LC08_L1TP_226011_20210519_20210528_02_T1	ice_conc_svalbard_202105191500.nc	-2319
	East_Greenland_Sea	LC08_L1TP_233006_20210520_20210528_02_T1	ice_conc_svalbard_202105201500.nc	158
	East_Greenland_Sea	LC08_L1TP_003005_20210525_20210529_02_T1	ice_conc_svalbard_202105251500.nc	1249
	East_Greenland_Sea	LC08_L1TP_002005_20210603_20210614_02_T1	ice_conc_svalbard_202106031500.nc	883
	East_Greenland_Sea	LC08_L1TP_009003_20210604_20210614_02_T1	ice_conc_svalbard_202106041500.nc	3431
	East_Greenland_Sea	LC08_L1TP_230006_20210616_20210622_02_T1	ice_conc_svalbard_202106161500.nc	-943
	East_Greenland_Sea	LC08_L1TP_001004_20210628_20210707_02_T1	ice_conc_svalbard_202106281500.nc	496
	East_Greenland_Sea	LC08_L1TP_003005_20210712_20210720_02_T1	ice_conc_svalbard_202107121500.nc	1262

East_Greenland_Sea	LC08_L1TP_001006_20210714_20210721_02_T1	ice_conc_svalbard_202107141500.nc	545
East_Greenland_Sea	LC08_L1TP_005004_20210726_20210804_02_T1	ice_conc_svalbard_202107261500.nc	1987
East_Greenland_Sea	LC08_L1TP_003004_20210728_20210804_02_T1	ice_conc_svalbard_202107281500.nc	1246
East_Greenland_Sea	LC08_L1TP_007004_20210809_20210819_02_T1	ice_conc_svalbard_202108091500.nc	2734
East_Greenland_Sea	LC08_L1TP_225010_20210816_20210826_02_T1	ice_conc_svalbard_202108161500.nc	-2683
East_Greenland_Sea	LC08_L1TP_232006_20210817_20210827_02_T1	ice_conc_svalbard_202108171500.nc	-182
East_Greenland_Sea	LC08_L1TP_006004_20210818_20210827_02_T1	ice_conc_svalbard_202108181500.nc	2366
East_Greenland_Sea	LC08_L1TP_007004_20210825_20210901_02_T1	ice_conc_svalbard_202108251500.nc	2739
East_Greenland_Sea	LC08_L1TP_227012_20210830_20210909_02_T1	ice_conc_svalbard_202108301500.nc	-1889
East_Greenland_Sea	LC08_L1TP_006003_20210903_20210910_02_T2	ice_conc_svalbard_202109031500.nc	2347
East_Greenland_Sea	LC08_L1TP_226012_20210908_20210916_02_T1	ice_conc_svalbard_202109081500.nc	-2257
East_Greenland_Sea	LC08_L1TP_227011_20210915_20210925_02_T1	ice_conc_svalbard_202109151500.nc	-1909
East_Greenland_Sea	LC08_L1TP_001006_20220412_20220419_02_T1	ice_conc_svalbard_202204121500.nc	540
East_Greenland_Sea	LC08_L1TP_225011_20220413_20220420_02_T2	ice_conc_svalbard_202204131500.nc	-2677
East_Greenland_Sea	LC08_L1TP_002005_20220419_20220427_02_T1	ice_conc_svalbard_202204191500.nc	886
East_Greenland_Sea	LC08_L1TP_226009_20220420_20220427_02_T1	ice_conc_svalbard_202204201500.nc	-2356
East_Greenland_Sea	LC08_L1TP_233006_20220421_20220428_02_T1	ice_conc_svalbard_202204211500.nc	168
East_Greenland_Sea	LC08_L1TP_007004_20220422_20220428_02_T1	ice_conc_svalbard_202204221500.nc	2716
East_Greenland_Sea	LC08_L1TP_229007_20220425_20220503_02_T1	ice_conc_svalbard_202204251500.nc	-1293
East_Greenland_Sea	LC08_L1TP_003005_20220426_20220503_02_T1	ice_conc_svalbard_202204261500.nc	1254
East_Greenland_Sea	LC08_L1TP_001005_20210916_20210925_02_T1	ice_conc_svalbard_202109161500.nc	543
East_Greenland_Sea	LC08_L1TP_228012_20210922_20210930_02_T1	ice_conc_svalbard_202109221500.nc	-1514
East_Greenland_Sea	LC08_L1TP_227011_20211001_20211013_02_T1	ice_conc_svalbard_202110011500.nc	-1904
East_Greenland_Sea	LC08_L1TP_229012_20220324_20220330_02_T1	ice_conc_svalbard_202203241500.nc	-1171
East_Greenland_Sea	LC08_L1TP_232005_20220329_20220405_02_T2	ice_conc_svalbard_202203291500.nc	-231
East_Greenland_Sea	LC08_L1TP_006004_20220330_20220406_02_T1	ice_conc_svalbard_202203301500.nc	2341
East_Greenland_Sea	LC08_L1TP_230008_20220331_20220406_02_T1	ice_conc_svalbard_202203311500.nc	-901
East_Greenland_Sea	LC08_L1TP_004004_20220401_20220411_02_T2	ice_conc_svalbard_202204011500.nc	1599
East_Greenland_Sea	LC08_L1TP_226010_20220404_20220412_02_T1	ice_conc_svalbard_202204041500.nc	-2335
East_Greenland_Sea	LC08_L1TP_224010_20220406_20220412_02_T1	ice_conc_svalbard_202204061500.nc	-3076
East_Greenland_Sea	LC08_L1TP_231006_20220407_20220412_02_T1	ice_conc_svalbard_202204071500.nc	-575
East_Greenland_Sea	LC08_L1TP_005004_20220408_20220412_02_T2	ice_conc_svalbard_202204081500.nc	1974
East_Greenland_Sea	LC08_L1TP_001004_20220428_20220503_02_T2	ice_conc_svalbard_202204281500.nc	488
East_Greenland_Sea	LC08_L1TP_004003_20220503_20220511_02_T2	ice_conc_svalbard_202205031500.nc	1580
East_Greenland_Sea	LC08_L1TP_231007_20220509_20220518_02_T1	ice_conc_svalbard_202205091500.nc	-545
East_Greenland_Sea	LC08_L1TP_005003_20220510_20220518_02_T2	ice_conc_svalbard_202205101500.nc	1956
East_Greenland_Sea	LC08_L1TP_229006_20220511_20220519_02_T1	ice_conc_svalbard_202205111500.nc	-1310
East_Greenland_Sea	LC08_L1TP_003005_20220512_20220519_02_T1	ice_conc_svalbard_202205121500.nc	1262
East_Greenland_Sea	LC08_L1TP_227012_20220513_20220519_02_T1	ice_conc_svalbard_202205131500.nc	-1907
East_Greenland_Sea	LC08_L1TP_230008_20220518_20220525_02_T1	ice_conc_svalbard_202205181500.nc	-889
East_Greenland_Sea	LC08_L1TP_230009_20220603_20220610_02_T1	ice_conc_svalbard_202206031500.nc	-860
East_Greenland_Sea	LC08_L1TP_226012_20220607_20220610_02_T1	ice_conc_svalbard_202206071500.nc	-2268
East_Greenland_Sea	LC08_L1TP_007004_20220609_20220616_02_T1	ice_conc_svalbard_202206091500.nc	2734
East_Greenland_Sea	LC08_L1TP_231007_20220610_20220616_02_T1	ice_conc_svalbard_202206101500.nc	-531
East_Greenland_Sea	LC08_L1TP_008003_20220616_20220629_02_T1	ice_conc_svalbard_202206161500.nc	3086
East_Greenland_Sea	LC08_L1TP_231006_20220712_20220722_02_T1	ice_conc_svalbard_202207121500.nc	-549
East_Greenland_Sea	LC08_L1TP_229012_20220714_20220726_02_T1	ice_conc_svalbard_202207141500.nc	-1148
East_Greenland_Sea	LC08_L1TP_003005_20220715_20220725_02_T1	ice_conc_svalbard_202207151500.nc	1281
East_Greenland_Sea	LC08_L1TP_232006_20220804_20220818_02_T1	ice_conc_svalbard_202208041500.nc	-164
East_Greenland_Sea	LC08_L1TP_229012_20220815_20220824_02_T1	ice_conc_svalbard_202208151500.nc	-1129
East_Greenland_Sea	LC08_L1TP_227011_20220817_20220824_02_T1	ice_conc_svalbard_202208171500.nc	-1894
East_Greenland_Sea	LC08_L1TP_004003_20220823_20220923_02_T1	ice_conc_svalbard_202208231500.nc	1623
East_Greenland_Sea	LC08_L1TP_230008_20220907_20220914_02_T1	ice_conc_svalbard_202209071500.nc	-851
Central_Arctic	LC08_L1TP_221244_20210430_20210508_02_T2	ice_conc_svalbard_202104301500.nc	1397
Central_Arctic	LC08_L1TP_226243_20210503_20210508_02_T2	ice_conc_svalbard_202105031500.nc	3225
Central_Arctic	LC08_L1TP_214243_20210803_20210811_02_T1	ice_conc_svalbard_202108031500.nc	-1191
Central_Arctic	LC08_L1TP_224002_20220406_20220412_02_T1	ice_conc_svalbard_202204061500.nc	-3267
Central_Arctic	LC08_L1TP_226001_20220420_20220427_02_T2	ice_conc_svalbard_202204201500.nc	-2546
Central_Arctic	LC08_L1GT_229001_20220425_20220503_02_T2	ice_conc_svalbard_202204251500.nc	-1436
Central_Arctic	LC08_L1TP_214245_20220518_20220525_02_T2	ice_conc_svalbard_202205181500.nc	-1151
Central_Arctic	LC08_L1TP_225243_20220718_20220726_02_T1	ice_conc_svalbard_202207181500.nc	2899
Kara_Sea	LC08_L1GT_222242_20210507_20210517_02_T2	ice_conc_svalbard_202105071500.nc	1717
Kara_Sea	LC08_L1TP_214243_20210803_20210811_02_T1	ice_conc_svalbard_202108031500.nc	-1191

	Sea	Landsat ID	Ice Concentration File	Value
	Kara_Sea	LC08_L1TP_212242_20210805_20210811_02_T1	ice_conc_svalbard_202108051500.nc	-1956
	Kara_Sea	LC08_L1TP_209242_20220803_20220806_02_T1	ice_conc_svalbard_202208031500.nc	-3047
C2	East_Greenland_Sea	LC08_L1TP_228012_20210330_20210409_02_T1	ice_conc_svalbard_202103301500.nc	-1544
	East_Greenland_Sea	LC08_L1TP_229007_20210406_20210415_02_T1	ice_conc_svalbard_202104061500.nc	-1295
	East_Greenland_Sea	LC08_L1TP_227007_20220411_20220419_02_T1	ice_conc_svalbard_202204111500.nc	-2032
	East_Greenland_Sea	LC08_L1TP_228008_20220317_20220322_02_T1	ice_conc_svalbard_202203171500.nc	-1632
	East_Greenland_Sea	LC08_L1TP_229009_20220324_20220330_02_T1	ice_conc_svalbard_202203241500.nc	-1243
	East_Greenland_Sea	LC08_L1TP_225011_20220328_20220405_02_T2	ice_conc_svalbard_202203281500.nc	-2682
	East_Greenland_Sea	LC08_L1TP_230006_20220331_20220406_02_T2	ice_conc_svalbard_202203311500.nc	-949
	East_Greenland_Sea	LC08_L1TP_009003_20220404_20220412_02_T1	ice_conc_svalbard_202204041500.nc	3431
C3	Barents_Sea	LC08_L1TP_215245_20210607_20210615_02_T2	ice_conc_svalbard_202106071500.nc	-790
	East_Greenland_Sea	LC08_L1TP_227010_20210323_20210402_02_T1	ice_conc_svalbard_202103231500.nc	-1961
	East_Greenland_Sea	LC08_L1TP_227010_20210408_20210416_02_T1	ice_conc_svalbard_202104081500.nc	-1966
	East_Greenland_Sea	LC08_L1TP_223014_20210412_20210423_02_T1	ice_conc_svalbard_202104121500.nc	-3355
	East_Greenland_Sea	LC08_L1TP_230008_20210413_20210423_02_T1	ice_conc_svalbard_202104131500.nc	-903
	East_Greenland_Sea	LC08_L1TP_003004_20210423_20210501_02_T1	ice_conc_svalbard_202104231500.nc	1221
	East_Greenland_Sea	LC08_L1TP_225010_20210426_20210501_02_T2	ice_conc_svalbard_202104261500.nc	-2716
	East_Greenland_Sea	LC08_L1TP_006004_20210428_20210507_02_T1	ice_conc_svalbard_202104281500.nc	2331
	East_Greenland_Sea	LC08_L1TP_004004_20210430_20210508_02_T1	ice_conc_svalbard_202104301500.nc	1588
	East_Greenland_Sea	LC08_L1TP_001004_20210511_20210524_02_T1	ice_conc_svalbard_202105111500.nc	475
	East_Greenland_Sea	LC08_L1TP_225002_20210512_20210524_02_T1	ice_conc_svalbard_202105121500.nc	-2909
	East_Greenland_Sea	LC08_L1TP_009002_20210519_20210528_02_T1	ice_conc_svalbard_202105191500.nc	3399
	East_Greenland_Sea	LC08_L1TP_227008_20210526_20210529_02_T1	ice_conc_svalbard_202105261500.nc	-2016
	East_Greenland_Sea	LC08_L1TP_001005_20210527_20210607_02_T1	ice_conc_svalbard_202105271500.nc	509
	East_Greenland_Sea	LC08_L1TP_225011_20210528_20210607_02_T1	ice_conc_svalbard_202105281500.nc	-2685
	East_Greenland_Sea	LC08_L1TP_231008_20210607_20210615_02_T1	ice_conc_svalbard_202106071500.nc	-527
	East_Greenland_Sea	LC08_L1TP_003004_20210610_20210621_02_T1	ice_conc_svalbard_202106101500.nc	1233
	East_Greenland_Sea	LC08_L1TP_223014_20210615_20210622_02_T1	ice_conc_svalbard_202106151500.nc	-3347
	East_Greenland_Sea	LC08_L1TP_230007_20210616_20210622_02_T1	ice_conc_svalbard_202106161500.nc	-919
	East_Greenland_Sea	LC08_L1TP_228008_20210618_20210628_02_T1	ice_conc_svalbard_202106181500.nc	-1636
	East_Greenland_Sea	LC08_L1TP_233006_20210621_20210629_02_T1	ice_conc_svalbard_202106211500.nc	171
	East_Greenland_Sea	LC08_L1TP_007003_20210622_20210629_02_T1	ice_conc_svalbard_202106221500.nc	2696
	East_Greenland_Sea	LC08_L1TP_001005_20210628_20210707_02_T1	ice_conc_svalbard_202106281500.nc	520
	East_Greenland_Sea	LC08_L1TP_230007_20210702_20210708_02_T1	ice_conc_svalbard_202107021500.nc	-915
	East_Greenland_Sea	LC08_L1TP_226002_20210706_20210713_02_T2	ice_conc_svalbard_202107061500.nc	-2517
	East_Greenland_Sea	LC08_L1TP_001005_20210714_20210721_02_T1	ice_conc_svalbard_202107141500.nc	521
	East_Greenland_Sea	LC08_L1TP_002005_20210721_20210729_02_T1	ice_conc_svalbard_202107211500.nc	895
	East_Greenland_Sea	LC08_L1TP_229009_20210727_20210804_02_T1	ice_conc_svalbard_202107271500.nc	-1231
	East_Greenland_Sea	LC08_L1TP_227012_20210729_20210804_02_T1	ice_conc_svalbard_202107291500.nc	-1900
	East_Greenland_Sea	LC08_L1TP_006004_20210802_20210811_02_T1	ice_conc_svalbard_202108021500.nc	2361
	East_Greenland_Sea	LC08_L1TP_231008_20210810_20210819_02_T1	ice_conc_svalbard_202108101500.nc	-507
	East_Greenland_Sea	LC08_L1TP_229007_20210812_20210819_02_T1	ice_conc_svalbard_202108121500.nc	-1272
	East_Greenland_Sea	LC08_L1TP_232005_20210817_20210827_02_T1	ice_conc_svalbard_202108171500.nc	-206
	East_Greenland_Sea	LC08_L1TP_233005_20210824_20210901_02_T1	ice_conc_svalbard_202108241500.nc	167
	East_Greenland_Sea	LC08_L1TP_005003_20210827_20210901_02_T2	ice_conc_svalbard_202108271500.nc	1974
	East_Greenland_Sea	LC08_L1TP_001004_20210831_20210909_02_T1	ice_conc_svalbard_202108311500.nc	516
	East_Greenland_Sea	LC08_L1TP_227010_20220411_20220419_02_T1	ice_conc_svalbard_202204111500.nc	-1960
	East_Greenland_Sea	LC08_L1TP_001005_20220412_20220419_02_T1	ice_conc_svalbard_202204121500.nc	516
	East_Greenland_Sea	LC08_L1TP_233005_20220421_20220428_02_T1	ice_conc_svalbard_202204211500.nc	144
	East_Greenland_Sea	LC08_L1TP_229006_20220425_20220503_02_T2	ice_conc_svalbard_202204251500.nc	-1317
	East_Greenland_Sea	LC08_L1TP_227010_20211001_20211013_02_T1	ice_conc_svalbard_202110011500.nc	-1928
	East_Greenland_Sea	LC08_L1TP_232008_20220329_20220405_02_T1	ice_conc_svalbard_202203291500.nc	-159
	East_Greenland_Sea	LC08_L1TP_007003_20220406_20220412_02_T1	ice_conc_svalbard_202204061500.nc	2690
	East_Greenland_Sea	LC08_L1TP_227007_20220427_20220503_02_T2	ice_conc_svalbard_202204271500.nc	-2036
	East_Greenland_Sea	LC08_L1TP_001005_20220428_20220503_02_T1	ice_conc_svalbard_202204281500.nc	511
	East_Greenland_Sea	LC08_L1TP_230006_20220502_20220511_02_T1	ice_conc_svalbard_202205021500.nc	-945
	East_Greenland_Sea	LC08_L1TP_226009_20220506_20220512_02_T1	ice_conc_svalbard_202205061500.nc	-2353
	East_Greenland_Sea	LC08_L1TP_231006_20220509_20220518_02_T1	ice_conc_svalbard_202205091500.nc	-569
	East_Greenland_Sea	LC08_L1TP_229008_20220511_20220519_02_T1	ice_conc_svalbard_202205111500.nc	-1262
	East_Greenland_Sea	LC08_L1TP_232008_20220516_20220524_02_T1	ice_conc_svalbard_202205161500.nc	-148
	East_Greenland_Sea	LC08_L1TP_230007_20220603_20220610_02_T1	ice_conc_svalbard_202206031500.nc	-907
	East_Greenland_Sea	LC08_L1TP_226011_20220607_20220610_02_T1	ice_conc_svalbard_202206071500.nc	-2292
	East_Greenland_Sea	LC08_L1TP_001005_20220701_20220707_02_T1	ice_conc_svalbard_202207011500.nc	541

	East_Greenland_Sea	LC08_L1TP_228001_20220707_20220721_02_T1	ice_conc_svalbard_202207071500.nc	-1779
	East_Greenland_Sea	LC08_L1TP_231008_20220712_20220722_02_T1	ice_conc_svalbard_202207121500.nc	-501
	East_Greenland_Sea	LC08_L1TP_225002_20220718_20220726_02_T1	ice_conc_svalbard_202207181500.nc	-2867
	East_Greenland_Sea	LC08_L1TP_008003_20220803_20220817_02_T1	ice_conc_svalbard_202208031500.nc	3101
	East_Greenland_Sea	LC08_L1TP_009002_20220826_20220909_02_T1	ice_conc_svalbard_202208261500.nc	3454
	East_Greenland_Sea	LC08_L1TP_227009_20220902_20220910_02_T1	ice_conc_svalbard_202209021500.nc	-1942
	East_Greenland_Sea	LC08_L1TP_232006_20220905_20220914_02_T1	ice_conc_svalbard_202209051500.nc	-158
	Central_Arctic	LC08_L1TP_225002_20210512_20210524_02_T1	ice_conc_svalbard_202105121500.nc	-2909
	Central_Arctic	LC08_L1TP_215245_20210607_20210615_02_T2	ice_conc_svalbard_202106071500.nc	-790
	Central_Arctic	LC08_L1TP_226002_20210706_20210713_02_T2	ice_conc_svalbard_202107061500.nc	-2517
	Central_Arctic	LC08_L1GT_216245_20220601_20220609_02_T2	ice_conc_svalbard_202206011500.nc	-406
	Central_Arctic	LC08_L1TP_228001_20220707_20220721_02_T1	ice_conc_svalbard_202207071500.nc	-1779
	Central_Arctic	LC08_L1TP_225002_20220718_20220726_02_T1	ice_conc_svalbard_202207181500.nc	-2867
	Central_Arctic	LC08_L1TP_209243_20220803_20220806_02_T1	ice_conc_svalbard_202208031500.nc	-3023
	Kara_Sea	LC08_L1GT_225238_20210629_20210708_02_T2	ice_conc_svalbard_202106291500.nc	2758
	Kara_Sea	LC08_L1TP_209243_20220803_20220806_02_T1	ice_conc_svalbard_202208031500.nc	-3023
C4	East_Greenland_Sea	LC08_L1TP_228010_20210330_20210409_02_T1	ice_conc_svalbard_202103301500.nc	-1592
	East_Greenland_Sea	LC08_L1TP_003004_20210407_20210415_02_T1	ice_conc_svalbard_202104071500.nc	1229
	East_Greenland_Sea	LC08_L1TP_227012_20210408_20210416_02_T1	ice_conc_svalbard_202104081500.nc	-1918
	East_Greenland_Sea	LC08_L1TP_001005_20210409_20210416_02_T1	ice_conc_svalbard_202104091500.nc	510
	East_Greenland_Sea	LC08_L1TP_229010_20210422_20210430_02_T1	ice_conc_svalbard_202104221500.nc	-1230
	East_Greenland_Sea	LC08_L1TP_225011_20210426_20210501_02_T2	ice_conc_svalbard_202104261500.nc	-2692
	East_Greenland_Sea	LC08_L1TP_232006_20210427_20210501_02_T1	ice_conc_svalbard_202104271500.nc	-216
	East_Greenland_Sea	LC08_L1TP_006003_20210428_20210507_02_T1	ice_conc_svalbard_202104281500.nc	2307
	East_Greenland_Sea	LC08_L1TP_001005_20210511_20210524_02_T1	ice_conc_svalbard_202105111500.nc	499
	East_Greenland_Sea	LC08_L1TP_008003_20210512_20210524_02_T1	ice_conc_svalbard_202105121500.nc	3048
	East_Greenland_Sea	LC08_L1TP_002005_20210518_20210528_02_T1	ice_conc_svalbard_202105181500.nc	874
	East_Greenland_Sea	LC08_L1TP_226010_20210519_20210528_02_T1	ice_conc_svalbard_202105191500.nc	-2343
	East_Greenland_Sea	LC08_L1TP_001004_20210527_20210607_02_T1	ice_conc_svalbard_202105271500.nc	485
	East_Greenland_Sea	LC08_L1TP_231008_20210623_20210630_02_T1	ice_conc_svalbard_202106231500.nc	-522
	East_Greenland_Sea	LC08_L1TP_231008_20210709_20210720_02_T1	ice_conc_svalbard_202107091500.nc	-520
	East_Greenland_Sea	LC08_L1TP_002004_20210721_20210729_02_T1	ice_conc_svalbard_202107211500.nc	872
	East_Greenland_Sea	LC08_L1TP_229012_20210727_20210804_02_T1	ice_conc_svalbard_202107271500.nc	-1159
	East_Greenland_Sea	LC08_L1TP_227011_20210729_20210804_02_T1	ice_conc_svalbard_202107291500.nc	-1924
	East_Greenland_Sea	LC08_L1TP_001005_20210730_20210804_02_T1	ice_conc_svalbard_202107301500.nc	529
	East_Greenland_Sea	LC08_L1TP_005004_20210811_20210819_02_T1	ice_conc_svalbard_202108111500.nc	1994
	East_Greenland_Sea	LC08_L1TP_232008_20210817_20210827_02_T1	ice_conc_svalbard_202108171500.nc	-134
	East_Greenland_Sea	LC08_L1TP_233006_20210824_20210901_02_T1	ice_conc_svalbard_202108241500.nc	190
	East_Greenland_Sea	LC08_L1TP_005004_20210827_20210901_02_T1	ice_conc_svalbard_202108271500.nc	1998
	East_Greenland_Sea	LC08_L1TP_232008_20210902_20210910_02_T1	ice_conc_svalbard_202109021500.nc	-130
	East_Greenland_Sea	LC08_L1TP_006004_20210903_20210910_02_T1	ice_conc_svalbard_202109031500.nc	2371
	East_Greenland_Sea	LC08_L1TP_227012_20220411_20220419_02_T1	ice_conc_svalbard_202204111500.nc	-1913
	East_Greenland_Sea	LC08_L1TP_229010_20220425_20220503_02_T1	ice_conc_svalbard_202204251500.nc	-1221
	East_Greenland_Sea	LC08_L1TP_003004_20220426_20220503_02_T1	ice_conc_svalbard_202204261500.nc	1231
	East_Greenland_Sea	LC08_L1TP_225010_20220328_20220405_02_T2	ice_conc_svalbard_202203281500.nc	-2706
	East_Greenland_Sea	LC08_L1TP_233006_20220405_20220412_02_T1	ice_conc_svalbard_202204051500.nc	166
	East_Greenland_Sea	LC08_L1TP_224011_20220406_20220412_02_T1	ice_conc_svalbard_202204061500.nc	-3052
	East_Greenland_Sea	LC08_L1TP_008003_20220429_20220504_02_T1	ice_conc_svalbard_202204291500.nc	3060
	East_Greenland_Sea	LC08_L1TP_230009_20220502_20220511_02_T1	ice_conc_svalbard_202205021500.nc	-873
	East_Greenland_Sea	LC08_L1TP_004004_20220503_20220511_02_T1	ice_conc_svalbard_202205031500.nc	1604
	East_Greenland_Sea	LC08_L1TP_002005_20220505_20220511_02_T1	ice_conc_svalbard_202205051500.nc	888
	East_Greenland_Sea	LC08_L1TP_226012_20220506_20220512_02_T1	ice_conc_svalbard_202205061500.nc	-2282
	East_Greenland_Sea	LC08_L1TP_231008_20220509_20220518_02_T1	ice_conc_svalbard_202205091500.nc	-521
	East_Greenland_Sea	LC08_L1TP_005004_20220510_20220518_02_T1	ice_conc_svalbard_202205101500.nc	1980
	East_Greenland_Sea	LC08_L1TP_229007_20220511_20220519_02_T1	ice_conc_svalbard_202205111500.nc	-1286
	East_Greenland_Sea	LC08_L1TP_003004_20220512_20220519_02_T1	ice_conc_svalbard_202205121500.nc	1239
	East_Greenland_Sea	LC08_L1TP_228010_20220824_20220924_02_T1	ice_conc_svalbard_202208241500.nc	-1547
	East_Greenland_Sea	LC08_L1TP_002005_20220825_20220924_02_T1	ice_conc_svalbard_202208251500.nc	929
	East_Greenland_Sea	LC08_L1TP_009003_20220826_20220909_02_T1	ice_conc_svalbard_202208261500.nc	3478
	East_Greenland_Sea	LC08_L1TP_227012_20220902_20220910_02_T1	ice_conc_svalbard_202209021500.nc	-1871
	East_Greenland_Sea	LC08_L1TP_230008_20220923_20220929_02_T1	ice_conc_svalbard_202209231500.nc	-846
	Central_Arctic	LC08_L1TP_225001_20220718_20220726_02_T1	ice_conc_svalbard_202207181500.nc	-2891

S3 Melt Pond Fraction Data

Filename (Melt Pond Fraction)	Filename (Landsat-8)	Time Difference [sec[
20210719_T45XVK_s2_mpf.nc	LC08_L1TP_173002_20210719_20210729_02_T1	-1539
20200806_T31XDL_s2_mpf.nc	LC08_L1GT_023243_20200806_20200916_02_T2	7268
20200806_T31XDL_s2_mpf.nc	LC08_L1TP_023244_20200806_20200916_02_T1	7292
20200711_T13XEL_s2_mpf.nc	LC08_L1TP_065001_20200711_20200912_02_T1	-5904
20210719_T14XMQ_s2_mpf.nc	LC08_L1TP_068001_20210719_20210729_02_T1	-2378
20200711_T13XEL_s2_mpf.nc	LC08_L1TP_081244_20200711_20200912_02_T1	5842

Table S3: List of Landsat-8 scenes and melt pond fraction datasets used for evaluation. Time differences between the two data for
25   each scene are also tabulated.

S4 Sensitivity Test and Uncertainty Analysis

Region	Filename	
	C1	C2
	LC08_L1TP_058245_20200507_20200820_02_T1	LC08_L1TP_010020_20220222_20220301_02_T2
	LC08_L1TP_061244_20210429_20210508_02_T1	LC08_L1TP_014013_20200316_20200822_02_T1
	LC08_L1TP_044002_20210406_20210415_02_T1	LC08_L1TP_011010_20220317_20220322_02_T1
	LC08_L1TP_035248_20200826_20200905_02_T1	LC08_L1TP_029005_20210328_20210402_02_T1
	LC08_L1TP_039002_20210419_20210430_02_T1	LC08_L1TP_019013_20220426_20220503_02_T2
	LC08_L1TP_037002_20220830_20220910_02_T1	LC08_L1TP_056245_20220531_20220609_02_T1
	LC08_L1TP_081240_20200609_20200824_02_T1	LC08_L1TP_030008_20220322_20220330_02_T2
Baffin Bay	LC08_L1TP_016015_20220405_20220412_02_T1	LC08_L1TP_014009_20200401_20200822_02_T1
	LC08_L1TP_022011_20220922_20220929_02_T1	LC08_L1TP_038003_20200511_20200820_02_T1
	LC08_L1TP_011012_20220317_20220322_02_T1	LC08_L1TP_036005_20200411_20200822_02_T1
	C3	C4
	LC08_L1TP_038247_20210514_20210525_02_T1	LC08_L1TP_017016_20200812_20200918_02_T1
	LC08_L1TP_033005_20220514_20220519_02_T1	LC08_L1TP_018008_20210502_20210508_02_T1
	LC08_L1TP_051246_20220629_20220707_02_T1	LC08_L1TP_010011_20220801_20220805_02_T1
	LC08_L1TP_038002_20200425_20200822_02_T1	LC08_L1TP_067242_20220629_20220707_02_T1
	LC08_L1TP_034003_20210502_20210508_02_T1	LC08_L1TP_030248_20220626_20220706_02_T1

	C1	C2
	LC08_L1TP_040247_20220616_20220629_02_T1	LC08_L1TP_034003_20210822_20210827_02_T1
	LC08_L1TP_078241_20200722_20200911_02_T1	LC08_L1TP_018008_20220318_20220322_02_T1
	LC08_L1TP_060244_20210625_20210707_02_T1	LC08_L1TP_029005_20220705_20220722_02_T1
	LC08_L1TP_004026_20210921_20210930_02_T1	LC08_L1TP_013009_20220619_20220630_02_T1
	LC08_L1TP_018016_20220926_20221004_02_T1	LC08_L1TP_051246_20200623_20200823_02_T1

	C1	C2
	LC08_L1TP_197001_20220425_20220503_02_T2	LC08_L1TP_013242_20220518_20220525_02_T2
	LC08_L1TP_214002_20200731_20200908_02_T1	LC08_L1TP_184015_20210222_20210303_02_T1
	LC08_L1GT_194002_20220420_20220427_02_T2	LC08_L1TP_222001_20220424_20220503_02_T2
	LC08_L1GT_027238_20210602_20210608_02_T2	LC08_L1TP_177006_20220328_20220405_02_T2
	LC08_L1TP_172010_20210322_20210401_02_T1	LC08_L1GT_204246_20220426_20220503_02_T2
	LC08_L1TP_180008_20220605_20220610_02_T1	LC08_L1TP_171012_20210315_20210328_02_T1
	LC08_L1TP_186013_20210409_20210416_02_T1	LC08_L1TP_210002_20210503_20210508_02_T2
	LC08_L1TP_179006_20210915_20210924_02_T1	LC08_L1TP_203245_20210502_20210508_02_T1
	LC08_L1TP_008242_20220718_20220725_02_T1	LC08_L1TP_176011_20210318_20210328_02_T1
	LC08_L1TP_169012_20220304_20220314_02_T1	LC08_L1TP_169011_20210317_20210328_02_T2
Barents Sea	C3	C4
	LC08_L1TP_183014_20220712_20220722_02_T1	LC08_L1TP_184012_20200526_20200820_02_T1
	LC08_L1TP_177013_20220531_20220609_02_T1	LC08_L1TP_185015_20200330_20200822_02_T1
	LC08_L1TP_023239_20210606_20210615_02_T1	LC08_L1TP_186014_20200321_20200822_02_T1
	LC08_L1TP_205002_20200817_20200920_02_T2	LC08_L1TP_176011_20200721_20200911_02_T1
	LC08_L1TP_023240_20200619_20200824_02_T1	LC08_L1TP_178008_20220607_20220610_02_T1
	LC08_L1TP_169012_20210925_20211001_02_T1	LC08_L1TP_185014_20210605_20210614_02_T1
	LC08_L1TP_172012_20210626_20210707_02_T1	LC08_L1TP_184015_20211004_20211013_02_T1
	LC08_L1TP_174011_20220408_20220412_02_T1	LC08_L1TP_184012_20220703_20220708_02_T1
	LC08_L1TP_208003_20200619_20200823_02_T1	LC08_L1TP_174011_20200723_20200911_02_T1
	LC08_L1TP_026240_20220529_20220603_02_T2	LC08_L1TP_178014_20200719_20200911_02_T1

	C1	C2
	LC08_L1TP_060010_20210625_20210707_02_T1	LC08_L1TP_071011_20210403_20210409_02_T1
	LC08_L1GT_065010_20220717_20220725_02_T2	LC08_L1TP_059011_20210330_20210409_02_T1
	LC08_L1TP_063006_20210326_20210402_02_T1	LC08_L1TP_065006_20220327_20220405_02_T2
	LC08_L1GT_071008_20220524_20220602_02_T2	LC08_L1TP_071010_20210403_20210409_02_T2
	LC08_L1TP_072010_20200610_20200823_02_T1	LC08_L1TP_078010_20220322_20220330_02_T2
	LC08_L1TP_071010_20220406_20220412_02_T2	LC08_L1TP_075010_20200311_20200822_02_T2
Beaufort Sea	LC08_L1TP_061011_20220416_20220420_02_T1	LC08_L1TP_065006_20210409_20210416_02_T2
	LC08_L1TP_059009_20210415_20210424_02_T1	LC08_L1TP_079010_20210411_20210416_02_T2
	LC08_L1TP_061008_20220721_20220801_02_T1	LC08_L1TP_077010_20210328_20210402_02_T1
	LC08_L1TP_072011_20210410_20210416_02_T1	LC08_L1TP_075011_20210314_20210328_02_T1
	C3	C4
	LC08_L1TP_080010_20200704_20200913_02_T1	LC08_L1TP_060010_20220324_20220330_02_T1
	LC08_L1GT_073006_20220506_20220512_02_T2	LC08_L1TP_065012_20220327_20220405_02_T1
	LC08_L1TP_063011_20210513_20210524_02_T2	LC08_L1TP_073011_20200430_20200820_02_T1

	LC08_L1TP_079010_20200510_20200820_02_T1	LC08_L1GT_071010_20220422_20220428_02_T2
	LC08_L1TP_063011_20210614_20210622_02_T1	LC08_L1GT_072010_20220312_20220321_02_T2
	LC08_L1TP_064006_20220507_20220512_02_T2	LC08_L1TP_063011_20200611_20200824_02_T1
	LC08_L1TP_070011_20220330_20220406_02_T1	LC08_L1TP_079010_20210326_20210402_02_T1
	LC08_L1TP_064011_20210418_20210424_02_T1	LC08_L1TP_075011_20210720_20210729_02_T1
	LC08_L1TP_061011_20200731_20200908_02_T1	LC08_L1TP_072011_20210715_20210721_02_T1
	LC08_L1TP_065006_20210425_20210501_02_T2	LC08_L1TP_062008_20220423_20220428_02_T2

	C1	C2
	LC08_L1TP_090014_20200304_20200822_02_T2	LC08_L1TP_090015_20210408_20210416_02_T2
	LC08_L1GT_090015_20200405_20200822_02_T2	LC08_L1TP_082016_20200225_20200822_02_T2
	LC08_L1TP_080015_20221014_20221021_02_T1	LC08_L1TP_086013_20210311_20210317_02_T2
	LC08_L1TP_084014_20200310_20200822_02_T1	LC08_L1GT_082017_20200225_20200822_02_T2
	LC08_L1TP_095021_20200627_20200823_02_T1	LC08_L1TP_082014_20200328_20200822_02_T1
	LC08_L1TP_094017_20210319_20210328_02_T1	LC08_L1TP_086013_20210327_20210402_02_T2
	LC08_L1TP_079016_20200408_20200822_02_T1	LC08_L1TP_087014_20210318_20210328_02_T2
	LC08_L1TP_073020_20200210_20200823_02_T1	LC08_L1TP_079018_20210310_20210317_02_T2
	LC08_L1TP_084016_20210225_20210304_02_T2	LC08_L1TP_082015_20200328_20200822_02_T2
	LC08_L1TP_077023_20220126_20220204_02_T1	LC08_L1TP_075018_20200224_20200822_02_T2

Bering Sea	C3	C4
	LC08_L1TP_096018_20220524_20220602_02_T1	LC08_L1TP_099019_20200304_20200822_02_T1
	LC08_L1TP_089016_20200617_20200823_02_T1	LC08_L1TP_092013_20220425_20220503_02_T1
	LC08_L1TP_079014_20220430_20220504_02_T1	LC08_L1TP_082016_20220419_20220427_02_T1
	LC08_L1TP_090015_20200608_20200824_02_T1	LC08_L1TP_090014_20210526_20210607_02_T1
	LC08_L1TP_098021_20220826_20220924_02_T1	LC08_L1TP_098020_20210417_20210424_02_T1
	LC08_L1TP_083024_20211203_20211209_02_T1	LC08_L1TP_096017_20200228_20200822_02_T1
	LC08_L1TP_086013_20220602_20220610_02_T1	LC08_L1TP_096017_20211028_20211104_02_T1
	LC08_L1TP_099019_20200928_20201006_02_T1	LC08_L1TP_092015_20210711_20210720_02_T1
	LC08_L1TP_073019_20210924_20210930_02_T1	LC08_L1TP_095018_20220601_20220609_02_T1
	LC08_L1TP_078017_20200519_20200820_02_T1	LC08_L1TP_078016_20210420_20210430_02_T1

	C1	C2
	LC08_L1TP_046013_20200417_20200822_02_T2	LC08_L1TP_036010_20210329_20210409_02_T2
	LC08_L1TP_106240_20220615_20220627_02_T1	LC08_L1TP_055247_20220422_20220428_02_T1
	LC08_L1TP_061001_20210515_20210525_02_T1	LC08_L1TP_050008_20210331_20210409_02_T2
	LC08_L1TP_060247_20210422_20210430_02_T1	LC08_L1TP_049007_20220327_20220405_02_T2
Canadian	LC08_L1TP_060004_20210508_20210518_02_T1	LC08_L1TP_032012_20210317_20210328_02_T1
Archipelago	LC08_L1TP_062001_20220525_20220602_02_T1	LC08_L1TP_059009_20210330_20210409_02_T2
	LC08_L1TP_053009_20210320_20210401_02_T2	LC08_L1TP_052011_20210329_20210409_02_T1
	LC08_L1TP_033009_20200321_20200822_02_T1	LC08_L1TP_061006_20200325_20200822_02_T1
	LC08_L1TP_056011_20210410_20210416_02_T1	LC08_L1TP_049006_20220327_20220405_02_T2
	LC08_L1TP_106238_20200609_20200824_02_T1	LC08_L1TP_041009_20220420_20220428_02_T2

	C3	C4
	LC08_L1TP_037009_20220408_20220412_02_T1	LC08_L1TP_065006_20210425_20210501_02_T2

LC08_L1TP_043011_20210922_20210930_02_T1	LC08_L1TP_057006_20210503_20210508_02_T1
LC08_L1TP_062001_20220626_20220706_02_T1	LC08_L1TP_080243_20220726_20220802_02_T1
LC08_L1TP_041011_20200313_20200822_02_T2	LC08_L1TP_059004_20210618_20210628_02_T1
LC08_L1TP_060007_20210828_20210901_02_T1	LC08_L1TP_047013_20220329_20220406_02_T1
LC08_L1TP_041012_20220420_20220428_02_T2	LC08_L1TP_058247_20210424_20210501_02_T1
LC08_L1TP_042012_20210611_20210622_02_T1	LC08_L1TP_035008_20200725_20200908_02_T1
LC08_L1TP_039012_20210708_20210713_02_T1	LC08_L1TP_060001_20220511_20220519_02_T1
LC08_L1TP_060004_20200809_20200917_02_T1	LC08_L1TP_055002_20200502_20200820_02_T1
LC08_L1TP_047011_20210630_20210708_02_T1	LC08_L1TP_055010_20220711_20220722_02_T1

Central Arctic

C1	C2
LC08_L1TP_085243_20220714_20220722_02_T1	LC08_L1TP_023244_20210505_20210517_02_T2
LC08_L1TP_056248_20220413_20220420_02_T1	LC08_L1TP_065003_20220412_20220419_02_T2
LC08_L1TP_060004_20200419_20200822_02_T1	LC08_L1TP_065005_20220327_20220405_02_T1
LC08_L1TP_039244_20220524_20220602_02_T1	LC08_L1TP_065005_20210409_20210416_02_T2
LC08_L1TP_022245_20210514_20210525_02_T1	LC08_L1TP_062005_20220407_20220412_02_T1
LC08_L1TP_227001_20200726_20200908_02_T1	LC08_L1TP_064006_20220421_20220428_02_T2
LC08_L1TP_198242_20200512_20200820_02_T1	LC08_L1GT_192246_20200502_20201016_02_T2
LC08_L1TP_042245_20220427_20220503_02_T1	LC08_L1TP_124006_20210407_20210415_02_T1
LC08_L1TP_219002_20210822_20210827_02_T1	LC08_L1TP_065002_20220412_20220419_02_T2
LC08_L1TP_074245_20220614_20220627_02_T1	LC08_L1TP_029247_20220416_20220420_02_T1

C3	C4
LC08_L1TP_031244_20220617_20220629_02_T1	LC08_L1TP_030245_20210623_20210630_02_T1
LC08_L1TP_006247_20220821_20220923_02_T1	LC08_L1TP_048248_20200415_20200822_02_T1
LC08_L1TP_063006_20220617_20220629_02_T1	LC08_L1TP_035247_20220512_20220519_02_T1
LC08_L1TP_052245_20210617_20210628_02_T1	LC08_L1GT_073005_20220506_20220512_02_T2
LC08_L1TP_012248_20220714_20220725_02_T1	LC08_L1TP_033244_20220530_20220609_02_T1
LC08_L1TP_063004_20200627_20200823_02_T1	LC08_L1TP_049246_20210527_20210607_02_T1
LC08_L1TP_015247_20210513_20210524_02_T1	LC08_L1GT_182247_20220721_20220726_02_T2
LC08_L1TP_032245_20220523_20220602_02_T1	LC08_L1TP_074244_20220801_20220805_02_T1
LC08_L1TP_217002_20210808_20210819_02_T1	LC08_L1TP_013247_20200629_20200823_02_T1
LC08_L1TP_066001_20220825_20220924_02_T1	LC08_L1TP_059004_20210415_20210424_02_T1

Chukchi Sea

C1	C2
LC08_L1TP_087013_20210318_20210328_02_T2	LC08_L1TP_082013_20200328_20200822_02_T1
LC08_L1TP_079013_20220703_20220707_02_T1	LC08_L1TP_095011_20210310_20210317_02_T2
LC08_L1TP_091012_20200412_20200822_02_T2	LC08_L1TP_086014_20210327_20210402_02_T1
LC08_L1TP_081011_20200508_20200820_02_T2	LC08_L1TP_091012_20220402_20220412_02_T1
LC08_L1GT_092010_20220409_20220419_02_T2	LC08_L1TP_084013_20220401_20220411_02_T2
LC08_L1TP_086014_20200409_20200822_02_T1	LC08_L1TP_086013_20210327_20210402_02_T2
LC08_L1TP_090013_20220801_20220805_02_T1	LC08_L1TP_079014_20200408_20200822_02_T1
LC08_L1TP_090012_20220326_20220330_02_T2	LC08_L1TP_086013_20210311_20210317_02_T2
LC08_L1TP_094011_20200417_20200825_02_T2	LC08_L1TP_091012_20200327_20200822_02_T2
LC08_L1TP_080011_20210317_20210328_02_T1	LC08_L1TP_095010_20210310_20210317_02_T2

	C3	C4
	LC08_L1TP_083010_20200709_20210330_02_T1	LC08_L1TP_083014_20200607_20200824_02_T1
	LC08_L1TP_079014_20200814_20200920_02_T1	LC08_L1TP_080014_20200330_20200822_02_T1
	LC08_L1TP_084013_20200614_20200823_02_T1	LC08_L1TP_080011_20220320_20220329_02_T2
	LC08_L1TP_082013_20200515_20200820_02_T1	LC08_L1TP_079013_20220313_20220322_02_T1
	LC08_L1TP_096010_20220523_20220602_02_T1	LC08_L1TP_081012_20220311_20220321_02_T1
	LC08_L1TP_092012_20210422_20210430_02_T2	LC08_L1TP_088013_20220312_20220321_02_T2
	LC08_L1TP_088013_20220803_20220818_02_T1	LC08_L1TP_092011_20220425_20220503_02_T2
	LC08_L1TP_086014_20220602_20220610_02_T1	LC08_L1TP_087013_20220422_20220428_02_T2
	LC08_L1TP_083012_20210525_20210529_02_T1	LC08_L1TP_081011_20210425_20210501_02_T1
	LC08_L1TP_081013_20200711_20200912_02_T1	LC08_L1TP_079010_20220414_20220420_02_T2

	C1	C2
	LC08_L1TP_227011_20210915_20210925_02_T1	LC08_L1TP_229009_20220324_20220330_02_T1
	LC08_L1TP_232016_20200323_20200822_02_T1	LC08_L1TP_230008_20200325_20200822_02_T1
	LC08_L1TP_052240_20210601_20210608_02_T1	LC08_L1TP_009003_20220404_20220412_02_T1
	LC08_L1TP_019245_20200725_20200908_02_T1	LC08_L1TP_228008_20220317_20220322_02_T1
	LC08_L1TP_229013_20220730_20220806_02_T1	LC08_L1TP_228008_20200412_20200822_02_T1
	LC08_L1TP_026244_20210627_20210707_02_T1	LC08_L1TP_010003_20210408_20210416_02_T1
	LC08_L1TP_233006_20210418_20210424_02_T1	LC08_L1TP_024245_20220429_20220504_02_T1
	LC08_L1TP_216003_20200424_20200822_02_T1	LC08_L1TP_228012_20210330_20210409_02_T1
East Greenland	LC08_L1TP_229010_20210508_20210518_02_T1	LC08_L1TP_230006_20220331_20220406_02_T2
Sea	LC08_L1TP_230006_20200528_20200820_02_T1	LC08_L1TP_231007_20200401_20200822_02_T1
	C3	C4
	LC08_L1TP_227008_20200827_20200906_02_T1	LC08_L1TP_220014_20220528_20220603_02_T1
	LC08_L1TP_001005_20210527_20210607_02_T1	LC08_L1TP_002005_20220505_20220511_02_T1
	LC08_L1TP_228001_20220707_20220721_02_T1	LC08_L1TP_012002_20210406_20210415_02_T1
	LC08_L1GT_229001_20210711_20210720_02_T2	LC08_L1TP_006003_20220501_20220511_02_T1
	LC08_L1TP_001004_20210831_20210909_02_T1	LC08_L1TP_037242_20200621_20200823_02_T1
	LC08_L1TP_035243_20220512_20220519_02_T1	LC08_L1TP_229008_20210422_20210430_02_T1
	LC08_L1TP_228007_20200428_20200820_02_T1	LC08_L1TP_231006_20220423_20220428_02_T1
	LC08_L1TP_218013_20210527_20210607_02_T1	LC08_L1TP_037243_20210523_20210529_02_T1
	LC08_L1TP_045241_20210616_20210622_02_T1	LC08_L1TP_233017_20200922_20201005_02_T1
	LC08_L1TP_024244_20210512_20210524_02_T1	LC08_L1TP_045241_20200629_20200824_02_T1

	C1	C2
	LC08_L1TP_121009_20210317_20210328_02_T2	LC08_L1TP_108011_20210322_20210401_02_T1
	LC08_L1TP_108010_20200319_20200822_02_T2	LC08_L1TP_099012_20220411_20220419_02_T1
	LC08_L1TP_121009_20200330_20200822_02_T1	LC08_L1TP_095011_20210326_20210402_02_T2
East Siberian Sea	LC08_L1TP_099012_20220310_20220315_02_T2	LC08_L1TP_125006_20210414_20210423_02_T2
	LC08_L1TP_122007_20220412_20220419_02_T1	LC08_L1TP_099011_20210323_20210402_02_T1
	LC08_L1TP_100012_20210501_20210508_02_T1	LC08_L1TP_125007_20200326_20200822_02_T1
	LC08_L1TP_100011_20200311_20200822_02_T2	LC08_L1TP_128006_20210403_20210409_02_T2
	LC08_L1TP_178238_20210620_20210629_02_T1	LC08_L1TP_113010_20200322_20200822_02_T2

	LC08_L1TP_094011_20210319_20210328_02_T2	LC08_L1TP_099012_20210307_20210317_02_T2
	LC08_L1TP_100011_20210330_20210409_02_T2	LC08_L1TP_099011_20210408_20210416_02_T2
	C3	C4
	LC08_L1TP_103011_20220407_20220412_02_T1	LC08_L1TP_111010_20220330_20220406_02_T1
	LC08_L1TP_108010_20210626_20210707_02_T1	LC08_L1TP_106011_20210527_20210607_02_T1
	LC08_L1GT_176239_20220609_20220616_02_T2	LC08_L1TP_093011_20220315_20220322_02_T2
	LC08_L1TP_115010_20200405_20200822_02_T2	LC08_L1GT_170239_20200711_20200912_02_T2
	LC08_L1TP_102011_20220502_20220511_02_T2	LC08_L1TP_119009_20200620_20200823_02_T1
	LC08_L1TP_099011_20220817_20220824_02_T1	LC08_L1TP_096011_20220320_20220329_02_T1
	LC08_L1TP_096010_20220608_20220616_02_T1	LC08_L1TP_109010_20210516_20210525_02_T1
	LC08_L1GT_121008_20200517_20200820_02_T2	LC08_L1TP_097011_20200509_20200820_02_T2
	LC08_L1TP_119008_20220407_20220412_02_T2	LC08_L1TP_098011_20220404_20220412_02_T1
	LC08_L1TP_105011_20210707_20210713_02_T1	LC08_L1TP_108010_20210525_20210529_02_T1
	C1	C2
	LC08_L1TP_025017_20210417_20210424_02_T2	LC08_L1TP_023018_20210318_20210328_02_T2
	LC08_L1TP_030010_20200417_20200822_02_T1	LC08_L1TP_020021_20220316_20220322_02_T1
	LC08_L1TP_028010_20220511_20220519_02_T1	LC08_L1TP_019016_20200404_20200822_02_T1
	LC08_L1TP_028011_20210929_20211012_02_T1	LC08_L1TP_027014_20210330_20210409_02_T1
	LC08_L1TP_028010_20200505_20200820_02_T1	LC08_L1TP_022021_20200308_20200822_02_T1
	LC08_L1TP_021020_20220627_20220706_02_T1	LC08_L1TP_032018_20200314_20200822_02_T2
	LC08_L1TP_029020_20210328_20210402_02_T1	LC08_L1TP_015018_20210326_20210402_02_T2
	LC08_L1TP_017017_20210324_20210402_02_T2	LC08_L1TP_029015_20200309_20200822_02_T2
	LC08_L1TP_024012_20200423_20200822_02_T1	LC08_L1TP_023012_20200331_20200822_02_T2
Hudson Bay	LC08_L1TP_032016_20220320_20220329_02_T1	LC08_L1TP_026011_20200421_20200822_02_T1
	C3	C4
	LC08_L1TP_021023_20220713_20220722_02_T1	LC08_L1TP_030016_20220407_20220412_02_T2
	LC08_L1TP_033019_20220818_20220823_02_T1	LC08_L1TP_020023_20220924_20221004_02_T1
	LC08_L1TP_028011_20210406_20210415_02_T2	LC08_L1TP_032018_20210317_20210328_02_T1
	LC08_L1TP_024014_20210715_20210721_02_T1	LC08_L1TP_026016_20200405_20200822_02_T2
	LC08_L1TP_023016_20210318_20210328_02_T1	LC08_L1TP_027016_20200701_20200913_02_T1
	LC08_L1TP_024016_20210901_20210909_02_T1	LC08_L1TP_019024_20210712_20210720_02_T1
	LC08_L1TP_025012_20210924_20210930_02_T1	LC08_L1TP_029013_20220619_20220630_02_T1
	LC08_L1TP_019020_20220426_20220503_02_T2	LC08_L1TP_019020_20220325_20220330_02_T1
	LC08_L1TP_022021_20220906_20220914_02_T1	LC08_L1TP_019016_20220715_20220725_02_T1
	LC08_L1GT_026014_20220513_20220519_02_T2	LC08_L1TP_026021_20221004_20221012_02_T1
	C1	C2
	LC08_L1TP_160010_20220422_20220428_02_T2	LC08_L1TP_160008_20210403_20210409_02_T2
	LC08_L1TP_177006_20220328_20220405_02_T2	LC08_L1TP_161013_20200306_20200822_02_T2
Kara Sea	LC08_L1TP_205245_20210430_20210508_02_T1	LC08_L1GT_160003_20210403_20210409_02_T2
	LC08_L1TP_165012_20200403_20200822_02_T1	LC08_L1TP_164008_20210330_20210409_02_T2
	LC08_L1TP_163008_20210323_20210402_02_T2	LC08_L1GT_158003_20220510_20220518_02_T2
	LC08_L1TP_162003_20200414_20200822_02_T2	LC08_L1TP_169011_20210317_20210328_02_T2

	LC08_L1TP_168008_20200408_20200822_02_T1	LC08_L1TP_167003_20210404_20210409_02_T2
	LC08_L1TP_160009_20220406_20220412_02_T2	LC08_L1GT_192246_20200502_20201016_02_T2
	LC08_L1GT_210241_20200703_20200913_02_T2	LC08_L1TP_165007_20210321_20210401_02_T2
	LC08_L1TP_164009_20220402_20220411_02_T1	LC08_L1TP_160009_20200416_20200822_02_T2
	C3	C4
	LC08_L1TP_167010_20210810_20210819_02_T1	LC08_L1TP_172011_20220613_20220617_02_T1
	LC08_L1TP_151005_20220509_20220518_02_T1	LC08_L1TP_164002_20200412_20200822_02_T2
	LC08_L1TP_166009_20210328_20210402_02_T1	LC08_L1TP_164007_20210330_20210409_02_T1
	LC08_L1TP_158008_20220627_20220706_02_T1	LC08_L1TP_185248_20220421_20220428_02_T1
	LC08_L1TP_201242_20200704_20200913_02_T1	LC08_L1TP_182246_20220721_20220726_02_T1
	LC08_L1TP_172010_20210712_20210720_02_T1	LC08_L1TP_164010_20200514_20200820_02_T1
	LC08_L1TP_161008_20210629_20210708_02_T1	LC08_L1TP_158007_20220611_20220617_02_T1
	LC08_L1TP_175010_20220602_20220609_02_T1	LC08_L1TP_168010_20210614_20210622_02_T1
	LC08_L1TP_160005_20200705_20200913_02_T1	LC08_L1TP_172011_20220731_20220806_02_T1
	LC08_L1TP_179006_20220716_20220726_02_T1	LC08_L1TP_158009_20200504_20200820_02_T2
	C1	C2
	LC08_L1TP_155005_20220419_20220427_02_T1	LC08_L1TP_121008_20220320_20220329_02_T1
	LC08_L1TP_147006_20210323_20210402_02_T1	LC08_L1TP_124007_20200404_20200822_02_T1
	LC08_L1TP_144006_20200416_20200822_02_T1	LC08_L1TP_128006_20210403_20210409_02_T2
	LC08_L1TP_125010_20200310_20200822_02_T2	LC08_L1TP_130008_20210401_20210409_02_T2
	LC08_L1TP_132009_20220317_20220322_02_T1	LC08_L1TP_150005_20220416_20220420_02_T1
	LC08_L1GT_149005_20210406_20210415_02_T2	LC08_L1TP_129006_20210325_20210402_02_T2
	LC08_L1TP_139008_20220318_20220322_02_T2	LC08_L1TP_174001_20220424_20220428_02_T2
	LC08_L1TP_144007_20220321_20220329_02_T1	LC08_L1TP_151005_20200417_20200822_02_T2
	LC08_L1TP_127006_20210428_20210507_02_T2	LC08_L1TP_129010_20210410_20210416_02_T1
	LC08_L1TP_150006_20220416_20220420_02_T1	LC08_L1TP_155004_20210331_20210409_02_T2
Laptev Sea	C3	C4
	LC08_L1TP_133009_20220425_20220503_02_T1	LC08_L1TP_129010_20220515_20220519_02_T1
	LC08_L1TP_131008_20210713_20210721_02_T1	LC08_L1TP_123009_20220318_20220322_02_T1
	LC08_L1TP_126010_20200621_20200823_02_T1	LC08_L1TP_122008_20210527_20210607_02_T1
	LC08_L1TP_150006_20200731_20200908_02_T1	LC08_L1TP_139008_20210331_20210409_02_T1
	LC08_L1TP_166002_20220502_20220511_02_T2	LC08_L1TP_130008_20200617_20200823_02_T1
	LC08_L1GT_158003_20220510_20220518_02_T2	LC08_L1TP_146007_20210401_20210409_02_T1
	LC08_L1TP_121010_20220405_20220412_02_T2	LC08_L1TP_126008_20220611_20220617_02_T1
	LC08_L1TP_130009_20210417_20210424_02_T2	LC08_L1TP_124009_20200911_20200919_02_T1
	LC08_L1TP_124009_20220410_20220419_02_T2	LC08_L1TP_124010_20220410_20220419_02_T1
	LC08_L1TP_152005_20220804_20220818_02_T1	LC08_L1TP_144008_20200923_20201006_02_T1

30   **Table S4: List of Landsat-8 scenes used in the sensitivity test.**

	$\dfrac{\partial \text{SIC}}{\partial \text{NDSI}}$ [%]	$\dfrac{\partial \text{SIC}}{\partial \rho_5}$ [%]
Sensitivity	-0.64	-36.95

35   **Table S5: Sensitivities computed numerically over all 480 scenes.**

Region	Sensitivity	
	$\dfrac{\partial \text{SIC}}{\partial \text{NDSI}}$ [%]	$\dfrac{\partial \text{SIC}}{\partial \rho_5}$ [%]
Baffin Bay	-0.81	-53.43
Barents Sea	-0.52	-43.21
Beaufort Sea	-0.50	-20.21
Bering Sea	-2.83	-58.45
Canadian Archipelago	-0.13	-16.34
Central Arctic	-0.41	-37.24
Chukchi Sea	-0.16	-29.72
E. Greenland Sea	-0.84	-42.95
E. Siberian Sea	-0.03	-35.53
Hudson Bay	-1.33	-35.61
Kara Sea	-0.76	-28.85
Laptev Sea	-0.14	-41.74

Table S6: Sensitivities computed numerically over each sub-region.

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Cloud contamination category	Sensitivity	
	$\dfrac{\partial \text{SIC}}{\partial \text{NDSI}}$ [%]	$\dfrac{\partial \text{SIC}}{\partial \rho_5}$ [%]
C1	-2.22	-42.74
C2	-0.03	-33.02
C3	-0.14	-44.31
C4	-0.03	-26.82

Table S7: Sensitivities computed numerically for each cloud contamination category.

SIC sub-range [%]	Sensitivity	
	$\dfrac{\partial SIC}{\partial NDSI}$ [%]	$\dfrac{\partial SIC}{\partial \rho_5}$ [%]
0-10	-0.08	-7.64
10-20	-0.81	-144.01
20-30	-1.06	-230.27
30-40	-1.26	-265.66
40-50	-1.44	-276.95
50-60	-1.22	-297.54
60-70	-0.93	-274.00
70-80	-0.69	-240.84
80-90	-0.39	-149.76
90-100	-0.02	-12.82

Table S8: Sensitivities computed numerically over each SIC sub-range.

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S5 Landsat-8 SIC Dataset

Sub-region	Cloud Contamination Category	Mean SIC [%]	Std. SIC [%]	N_{scene}	N_{pixel}
Baffin Bay	C1	69.59	43.27	727	76301
	C2	92.63	20.85	68	9441
	C3	47.53	44.54	886	183815
	C4	56.71	42.8	626	117085
Barents Sea	C1	50.15	47	258	40845
	C2	97.3	10.66	6	1086
	C3	26.21	41.02	244	72665
	C4	24.77	40	123	28844
Beaufort Sea	C1	89.83	26.06	194	37323
	C2	99.25	5.63	21	6598
	C3	75.58	36.89	101	28933
	C4	91.51	21.33	94	26529
Bering Sea	C1	57.4	46.82	152	20114
	C2	96.29	9.83	19	3303

				N_{scene}	N_{pixel}
	C3	28.45	42.12	234	59792
	C4	53.24	45.55	179	45355
Canadian A	C1	97.86	12.13	1537	291922
	C2	99.65	4.18	142	19808
	C3	84.52	32.78	819	204867
	C4	89.99	27.19	540	149110
Central Arctic	C1	88.03	29.91	1132	179148
	C2	99.67	2.9	40	7688
	C3	88.12	27.51	646	142530
	C4	86.35	28.5	385	68150
Chukchi Sea	C1	88.89	29.61	144	30839
	C2	97.9	8.31	31	5604
	C3	49.51	46	127	37332
	C4	81.48	35.39	106	27544
E. Greenland Sea	C1	73.07	40.78	641	84769
	C2	97.02	7.71	26	5717
	C3	55.13	44.91	353	83192
	C4	66.98	41.96	301	70497
E. Siberian Sea	C1	95.09	19.67	227	50554
	C2	99.44	5.81	38	9864
	C3	72.91	41.4	136	40397
	C4	86.24	31.87	132	37685
Hudson Bay	C1	78.39	38.99	565	84843
	C2	96.28	11.38	106	10182
	C3	43.8	45.67	348	96689
	C4	53.92	46.32	385	105082
Kara Sea	C1	86.79	31.7	448	87498
	C2	99.22	5.93	31	4681
	C3	53.49	45.41	236	68225
	C4	65.42	44.35	125	36858
Laptev Sea	C1	86.22	32.04	311	61149
	C2	97.57	10.45	21	5658
	C3	53.34	47.14	159	35842
	C4	77.42	38.06	127	32446

Table S9: The mean and the standard deviation of Landsat-8 SIC during the study period and the number of Landsat-8 scenes used for SIC production (N_{scene}) and the number of Landsat-8 SIC pixels produced (N_{pixel}) over the twelve sub-regions for the four cloud contamination categories.

S6 Evaluation of Ice And Open Water Classification Over Cloud Pixels
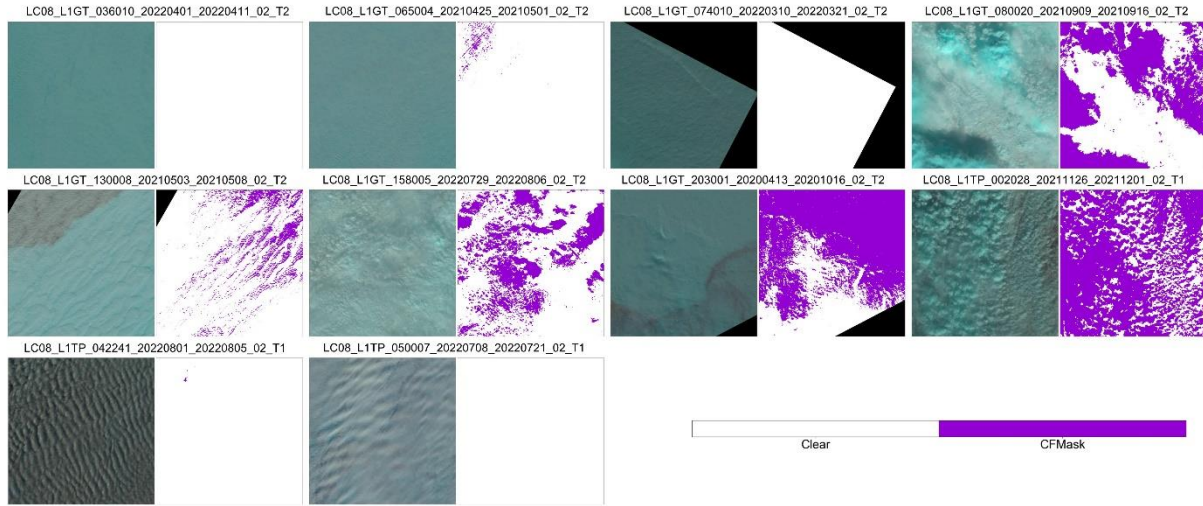
Figure S2: The (left panel) True-color image and (right panel) estimated cloud mask from CFMask over 10 scenes used for evaluation of SICs produced under C1. Cloud pixels detected by CFMask are shown as purple colour pixels. Cloud pixels undetected by CFMask are shown as black colour pixels. Fill values are shown as black colour pixels. The true-color images were downloaded from United States Geological Survey Earth Explorer The true-color images were downloaded from United States Geological Survey Earth Explorer (https://earthexplorer.usgs.gov/, last access: May 22, 2024).

Region	Filename
Canadian Archipelago	LC08_L1GT_036010_20220401_20220411_02_T2
Central Arctic	LC08_L1GT_065004_20210425_20210501_02_T2
Beaufort Sea	LC08_L1GT_074010_20220310_20220321_02_T2
Bering Sea	LC08_L1GT_080020_20210909_20210916_02_T2
Laptev Sea	LC08_L1GT_130008_20210503_20210508_02_T2
Kara Sea	LC08_L1GT_158005_20220729_20220806_02_T2
Barents Sea	LC08_L1GT_203001_20200413_20201016_02_T2
Baffin Bay Labrador Seas	LC08_L1TP_002028_20211126_20211201_02_T1
East Greenland Sea	LC08_L1TP_042241_20220801_20220805_02_T1
Canadian Archipelago	LC08_L1TP_050007_20220708_20220721_02_T1

Table S10: List of Landsat-8 scenes used to evaluate SICs produced under C1.