Introduction

Supplement material includes information of used interferograms in this study (Table-S1), ICESat-2 height difference data in 2021 thaw season (Figure-S1), and the coherence maps for two compared sites, Beta (located in discontinuous permafrost zone) and U8 (located in continuous permafrost zone) (Figure-S2).

Interferogram [Date1_Date2]	Perpendicular Baseline [m]
20170612_20170624	68
20170612_20170706	3.3
20170612_20170718	-93.4
20170612_20170730	-40.3
20170612_20170811	-20.2
20170624_20170730	-108.3
20170624_20170811	-88.2
20170624_20170823	-98.2
20170706_20170718	-96.7
20170706_20170730	-43.6
20170706_20170811	-23.5
20170706_20170823	-33.5
20170706_20170904	25.1
20170718_20170730	53.1
20170718_20170823	63.2
20170718_20170904	121.8
20170811_20170823	-10
20170811_20170904	48.6
20180607_20180701	96.4
20180607_20180713	151.8
20180619_20180701	83.8
20180619_20180713	139.2
20180619_20180725	83.5
20180619_20180806	50.9
20180619_20180818	-17.7
20180713_20180818	-156.9
20180713_20180830	-38.4
20180713_20180911	-50.1
20180725_20180818	-101.2
20180725_20180830	17.4
20180725_20180911	5.7
20180806_20180818	-68.6
20180806_20180830	50
20180806_20180911	38.3
20180818_20180830	118.6

20180818_20180911	106.9
20180830_20180911	-11.7
20190602_20190614	-77.5
20190602_20190626	-129.9
20190602_20190720	-70.4
20190602_20190801	-13.4
20190602_20190813	-54.3
20190614_20190708	-70.3
20190614_20190720	7.1
20190614_20190801	64.2
20190614_20190813	23.2
20190626_20190708	-18
20190626_20190720	59.5
20190626_20190813	75.6
20190626_20190825	8.2
20190708_20190720	77.4
20190708_20190801	134.5
20190708_20190813	93.5
20190708_20190825	26.2
20190708_20190906	-1
20190720_20190813	16.1
20190801_20190813	-40.9
20200608_20200620	56.3
20200608_20200714	-88.7
20200608_20200726	-26.7
20200608_20200807	-31.3
20200608_20200831	-16.1
20200620_20200714	-145
20200620_20200726	-82.9
20200620_20200807	-87.5
20200620_20200819	-108.7
20200620_20200831	-72.4
20200714_20200819	36.3
20200714_20200831	72.6
20200726_20200807	-4.6
20200726_20200819	-25.8
20200726_20200831	10.5
20200807_20200819	-21.2
20200807_20200831	15.1
20200819_20200831	36.3
20210603_20210709	163.6
20210603_20210721	90.4

20210603_20210802	80.2
20210603_20210814	85.5
20210603_20210907	94
20210615_20210721	23.2
20210615_20210802	13
20210615_20210814	18.2
20210615_20210826	22.5
20210627_20210721	-24.2
20210627_20210802	-34.4
20210627_20210814	-29.2
20210627_20210826	-24.9
20210709_20210814	-78.2
20210709_20210826	-73.9
20210709_20210907	-69.6
20210721_20210802	-10.2
20210721_20210826	-0.7
20210721_20210907	3.6
20210802_20210814	5.2
20210802_20210826	9.5
20210802_20210907	13.8
20210814_20210907	8.6
20220610_20220704	-29.6
20220610_20220716	-8.5
20220610_20220728	53.2
20220610_20220809	-25.5
20220610_20220821	1.5
20220622_20220716	26.8
20220622_20220728	88.5
20220622_20220809	9.8
20220622_20220821	36.8
20220704_20220809	4
20220704_20220821	31.1
20220716_20220728	61.7
20220716_20220809	-17
20220716_20220821	10
20220716_20220902	-26.1
20220728_20220809	-78.7
20220728_20220821	-51.7
20220809_20220821	27

Table-S1. Information of interferograms used in this study.
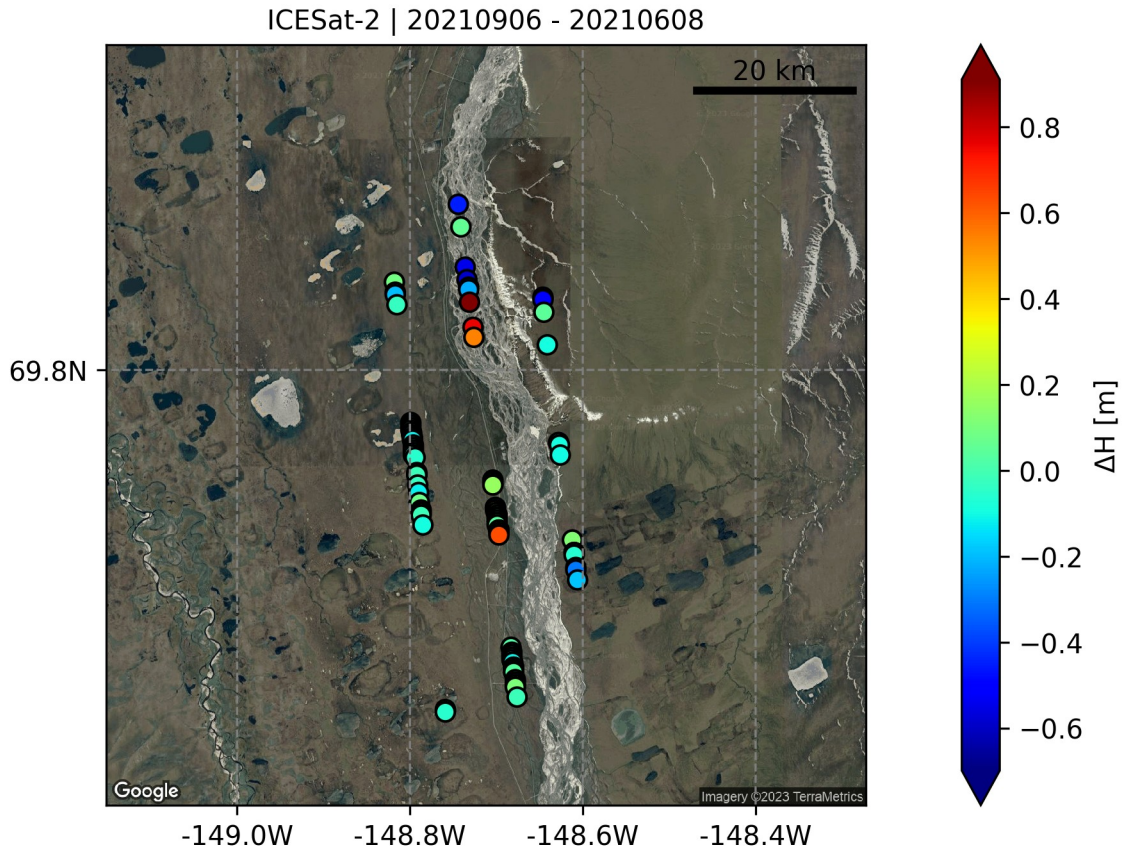
Figure-S1. ICESat-2 ATL-08 best-fitted terrain height ('h_te_best_fit') difference between two epochs: 2021-06-08 and 2021-09-06 for study area. Each circle represents height different between two epochs for 50 m grid cell. Read ICESat-2 data processing for details.
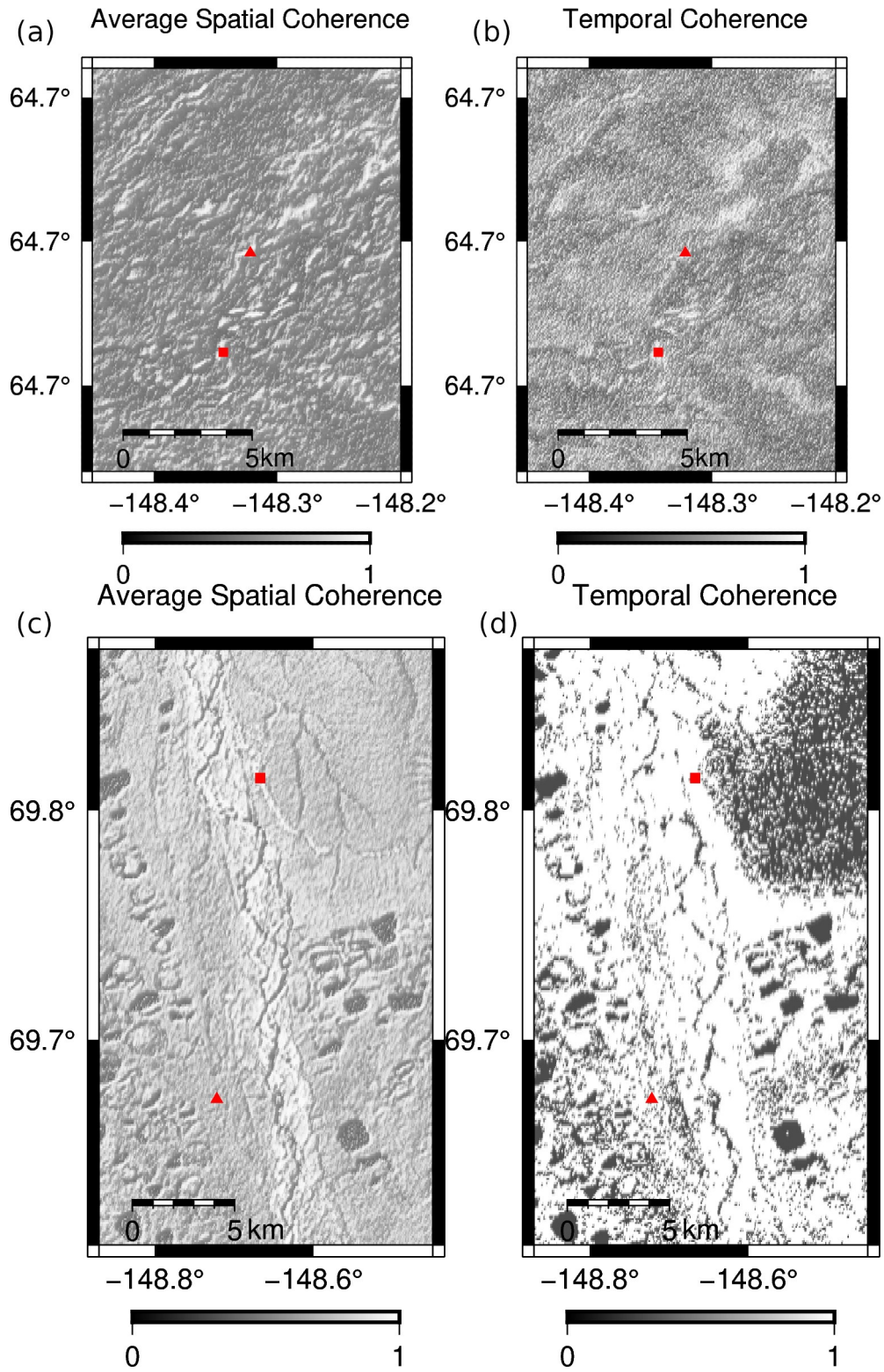
Figure-S2. Average spatial (a,c) and temporal (b,d) coherence for two sites: Top, Beta site southwest of Fairbanks, and bottom, CALM site U8. The triangles show the location of sites. The squares show the reference point selected for studies.