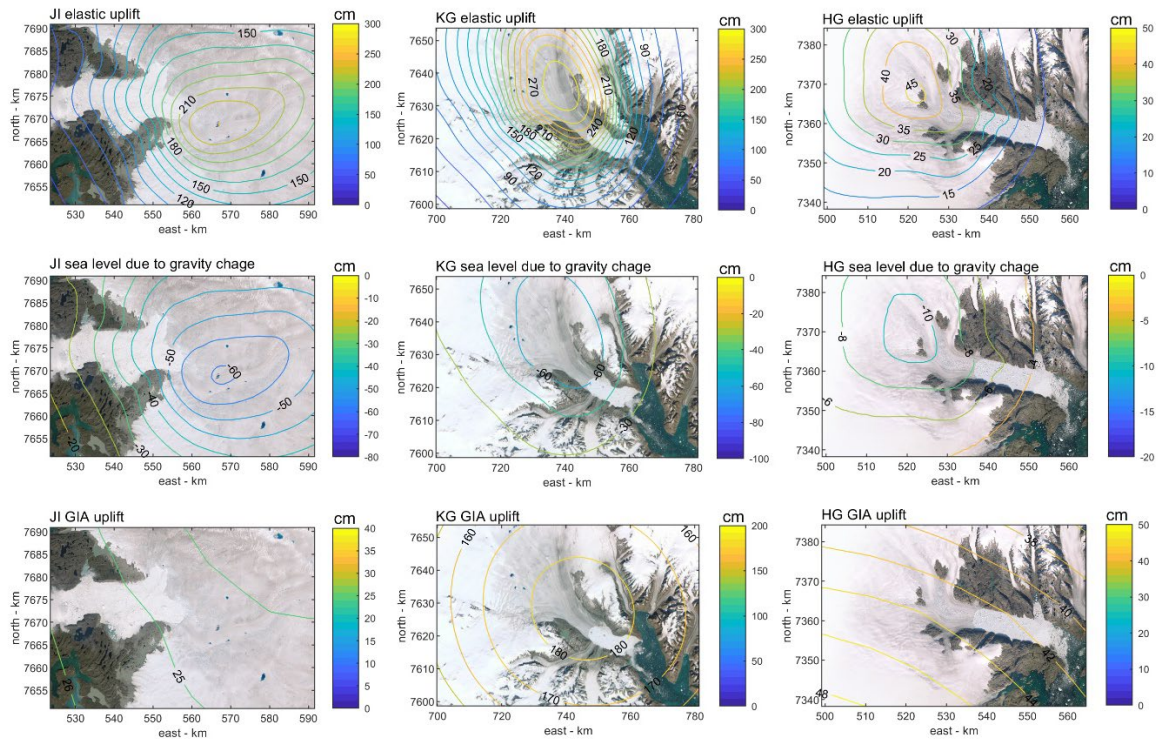


Supplementary Information

Centennial response of Greenland's three largest outlet glaciers

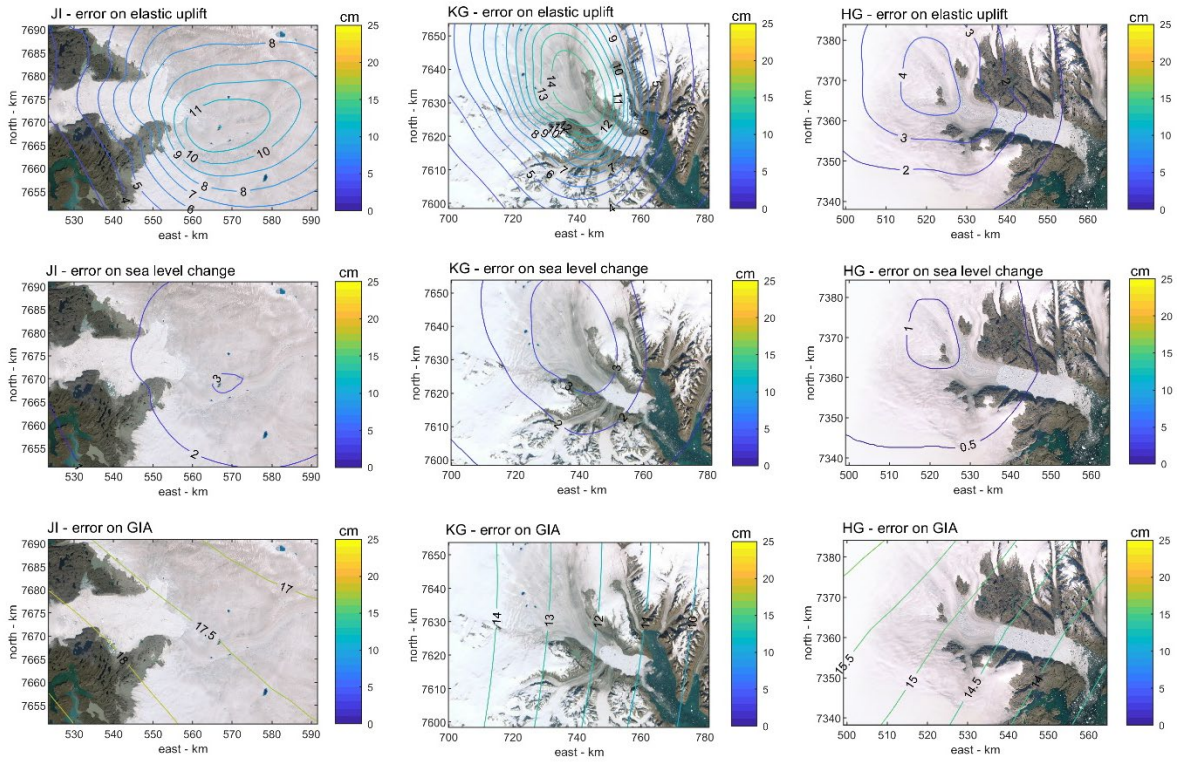
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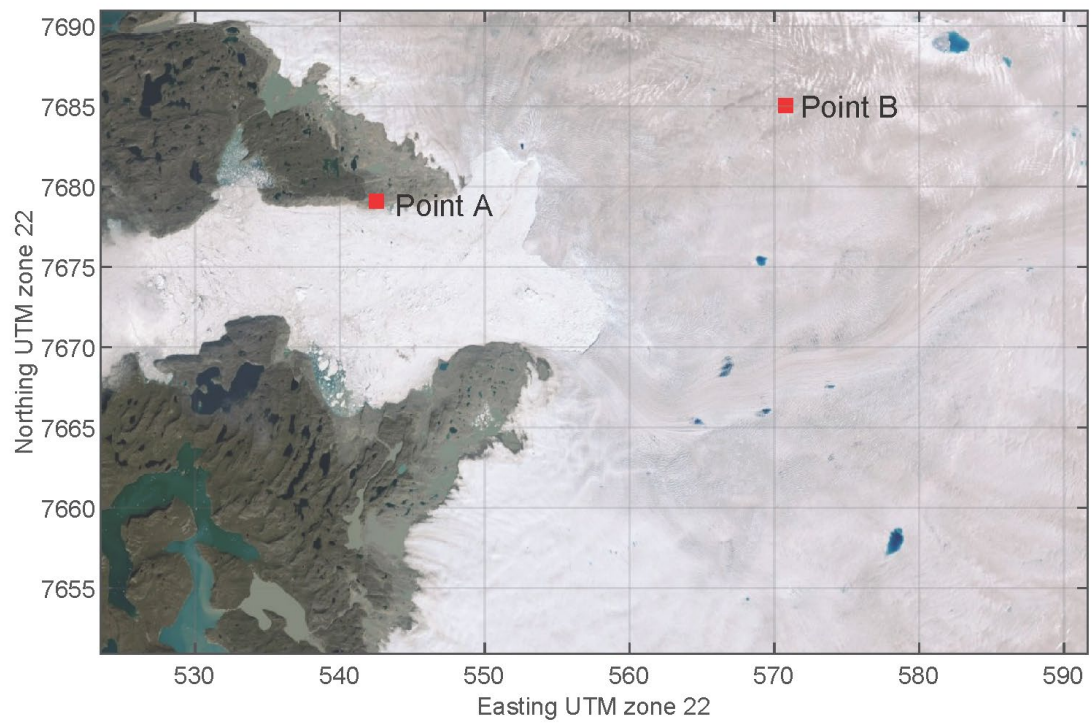
Supplementary Figure 1. Bedrock uplift and sea level change.

Accumulated elastic uplift, sea level change due to reduced gravity, and uplift due to glacial isostatic adjustment at Jakobshavn Isbræ (JI), Kangerlussuaq Glacier (KG) and Helheim Glacier (HG) during LIA-2012. Uplift of bedrock and sea level are provided in cm.



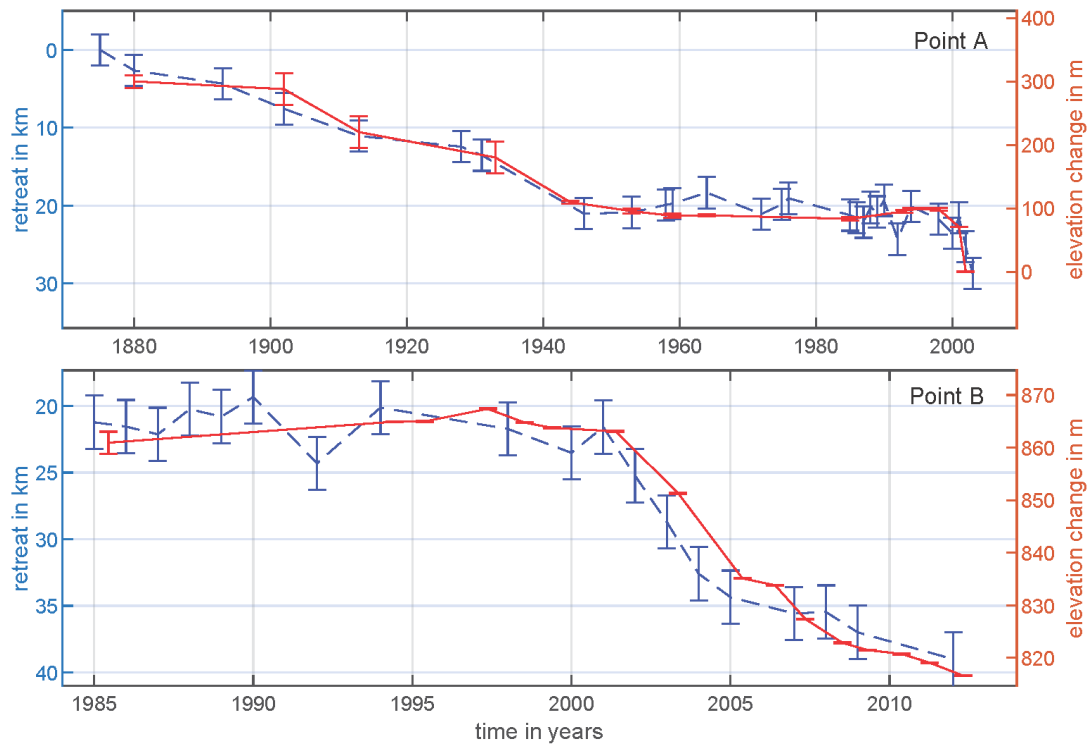
Supplementary Figure 2. Uncertainties.

Uncertainties related to each of the panel in Supplementary Fig. 1.



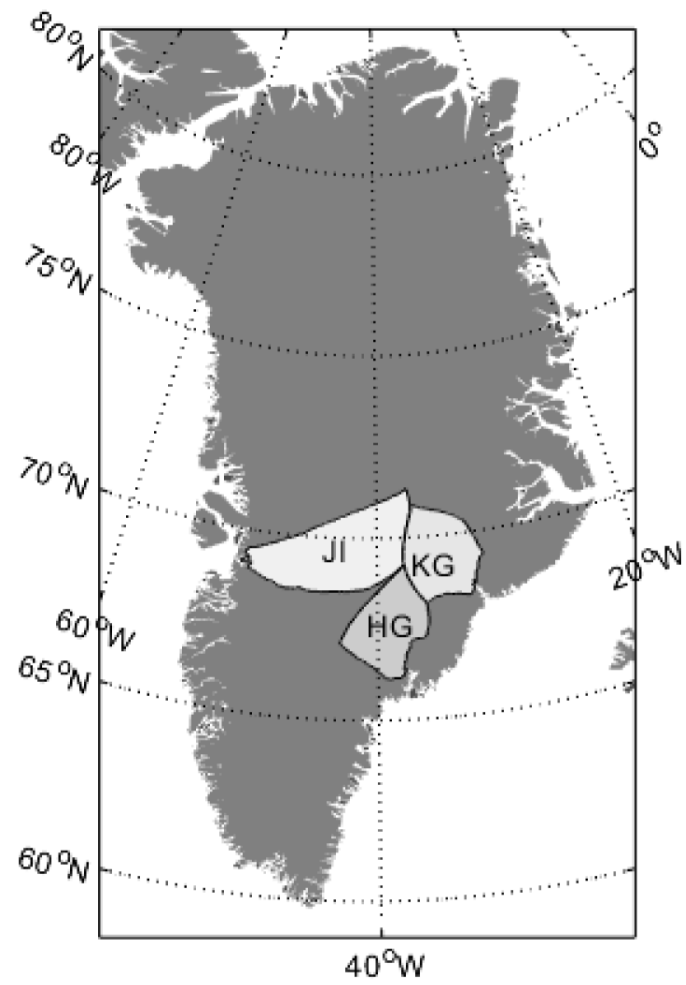
Supplementary Figure 3. Map of Jakobshavn.

Map of Jakobshavn Isbræ provided in UTM zone 22 coordinates in km. Time series of elevations at point A and B are shown in Supplementary Fig. 4.



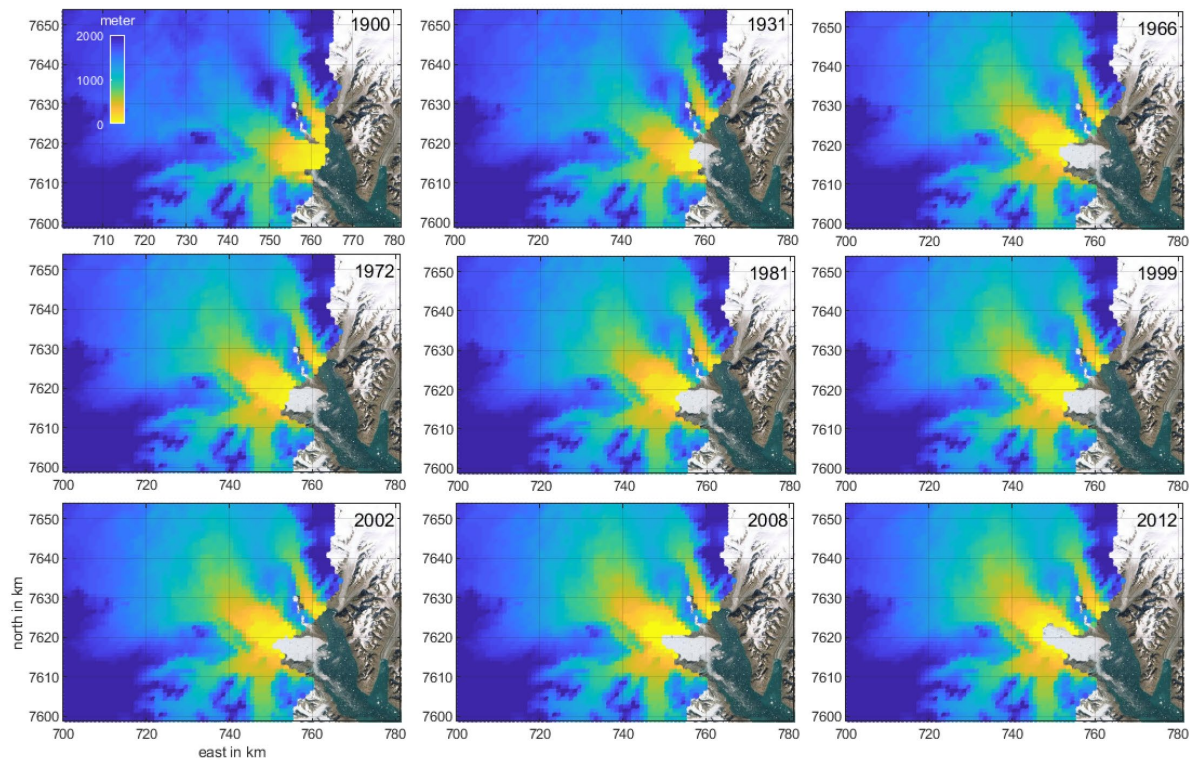
Supplementary Figure 4. Elevation change.

Time series of elevation change at point A and B in meter (right axis) and front retreat in km (left axis).



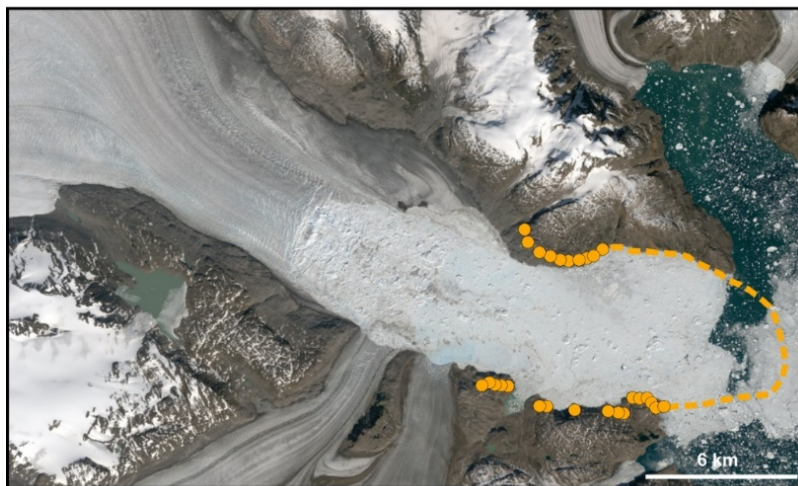
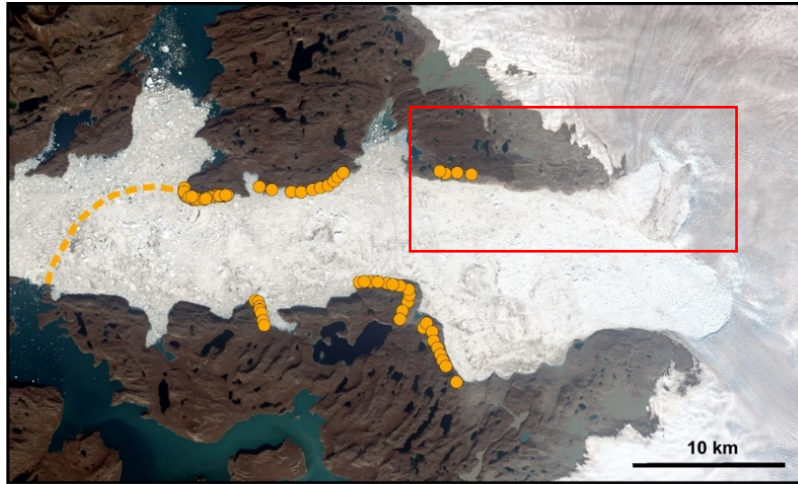
Supplementary Figure 5. Map of Greenland.

Map of Greenland and the drainage area of Jakobshavn Isbræ (JI), Kangerlussuaq Glacier(KG), and Helheim Glacier (HG).



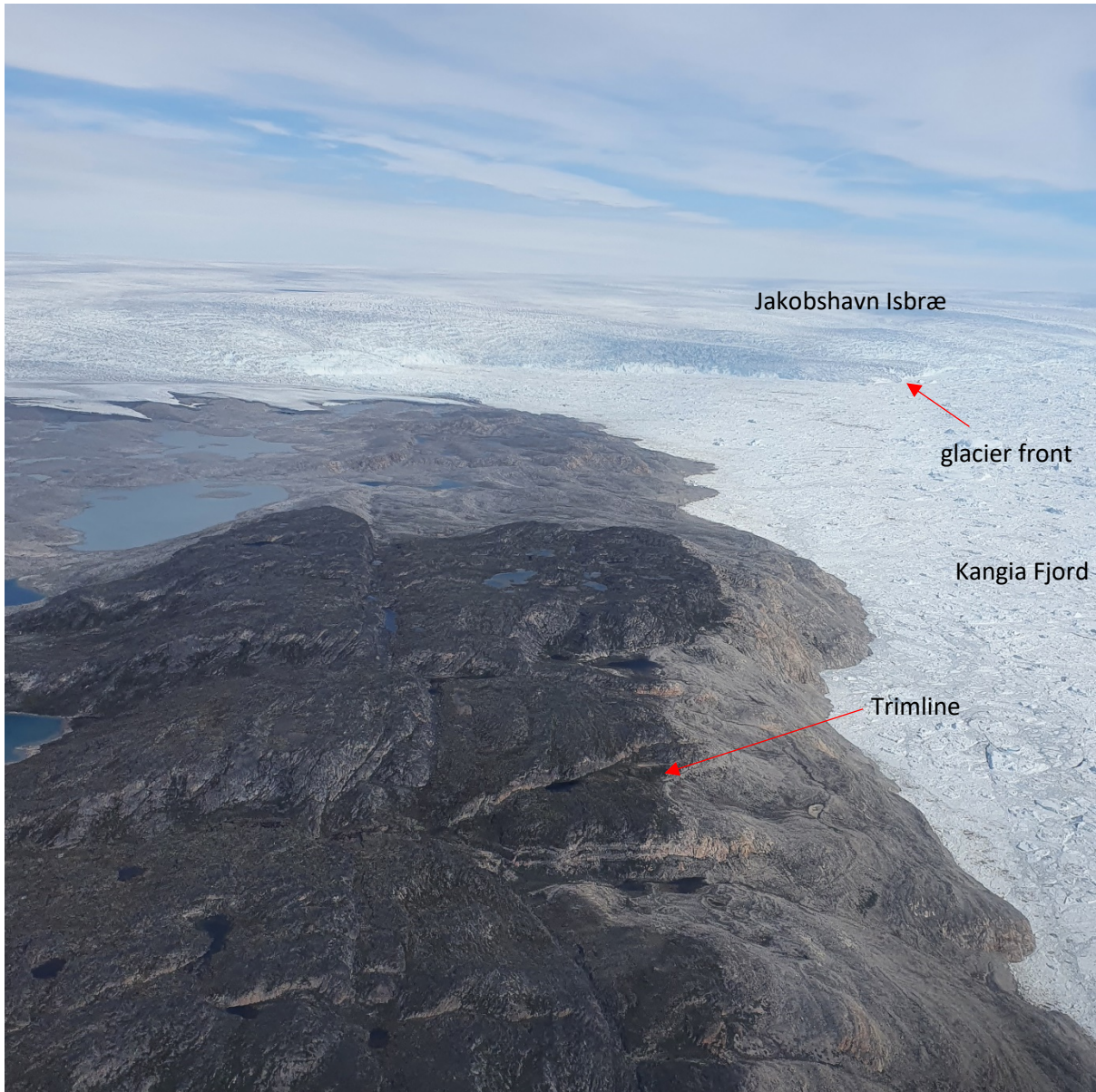
Supplementary Figure 6. Surface elevations.

Kangerlussuaq Glacier surface elevations in meter during 1880, 1931, 1966, 1972, 1981, 1999, 2002, 2008 and 2012.



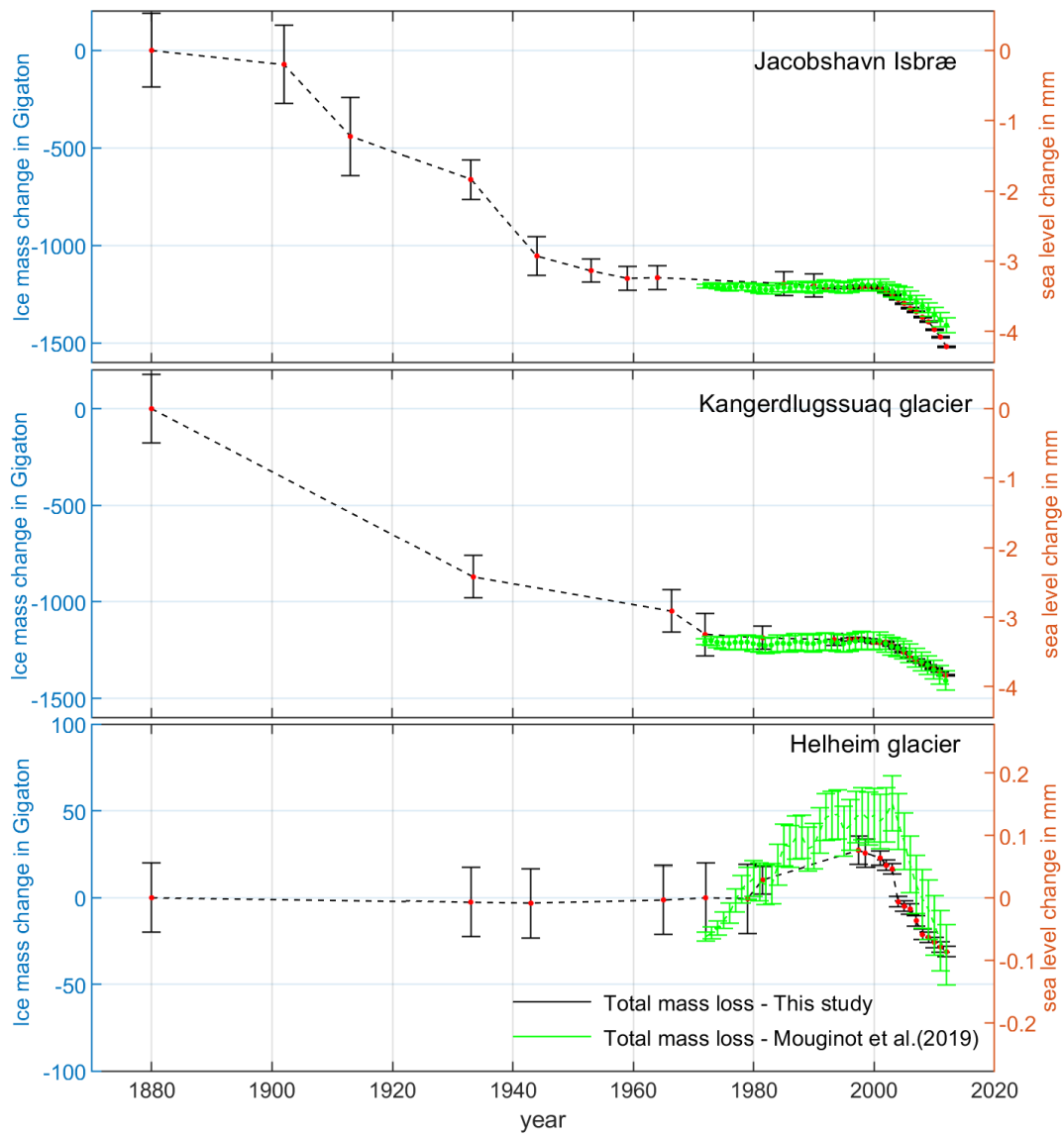
Supplementary Figure 7. Little Ice Age marginal positions.

The pre-1980s LIA marginal positions used to calculate total post-LIA mass loss. Hatched line shows the proposed LIA maximum position. The area marked by a red box is shown in Supplementary Fig. 8.



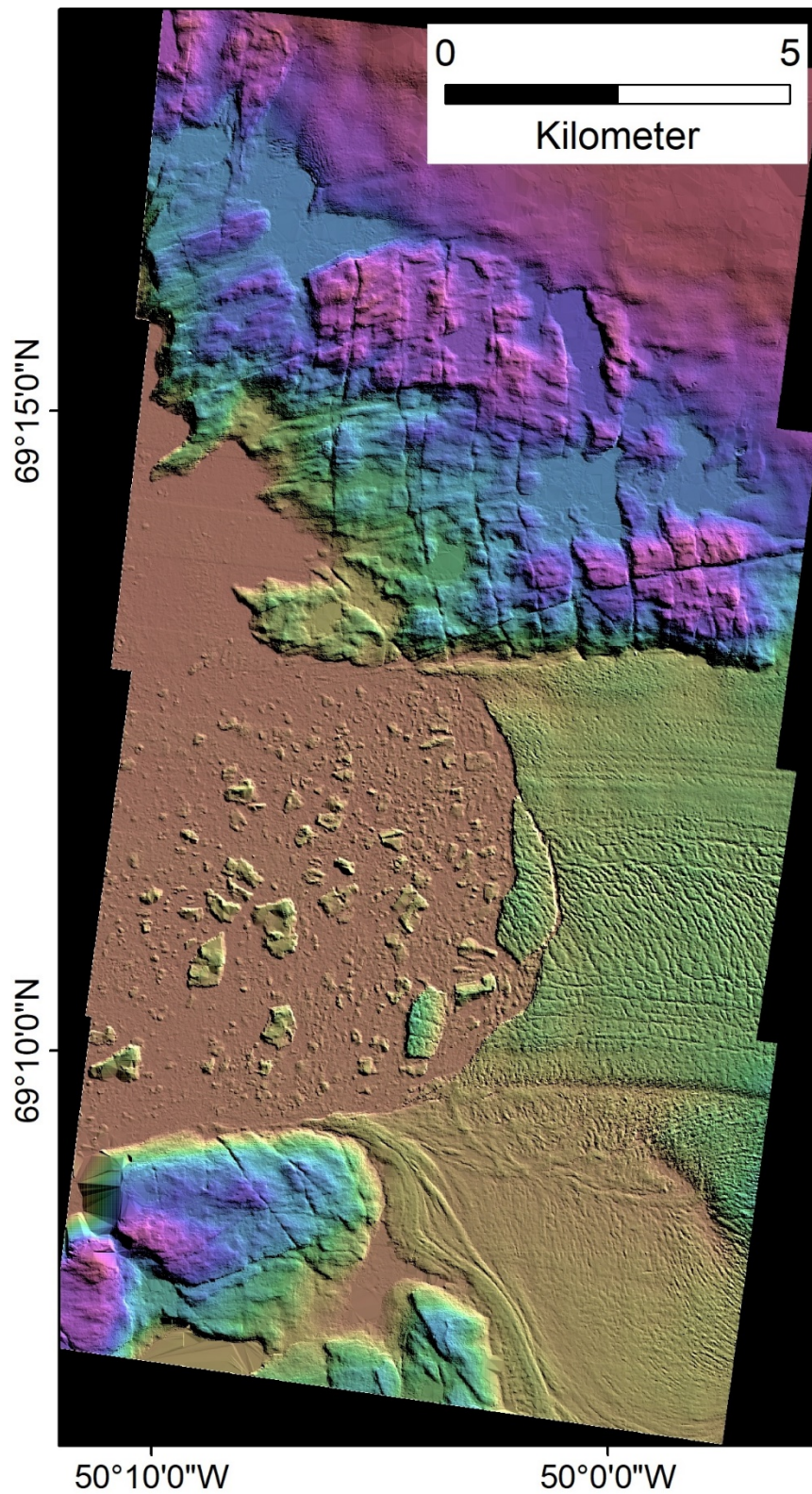
Supplementary Figure 8. Photo of Jakobshavn Isbræ.

Photo of the norther section of Kangia fjord next to Jakobshavn Isbræ acquired in July 2020.



Supplementary Figure 9. Ice mass loss.

Time series of accumulated ice mass loss of Jakobshavn Isbræ, Kangerlussuaq Glacier and Helheim Glacier. Black curve denotes this study. Green curve denotes Mouginito et al. (2019)¹⁵. Vertical lines denote error bars.



Supplementary Figure 10. Digital Elevation Model.

Hillshade of digital elevation model for the frontal portion of Jakobshavn Isbræ based on 1964 Aerial photographs.