Pedersen, V.K., Larsen, N.K., and Egholm, D.L., 2019, The timing of fjord formation and early glaciations in North and Northeast Greenland: Geology, https://doi.org/10.1130/G46064.1

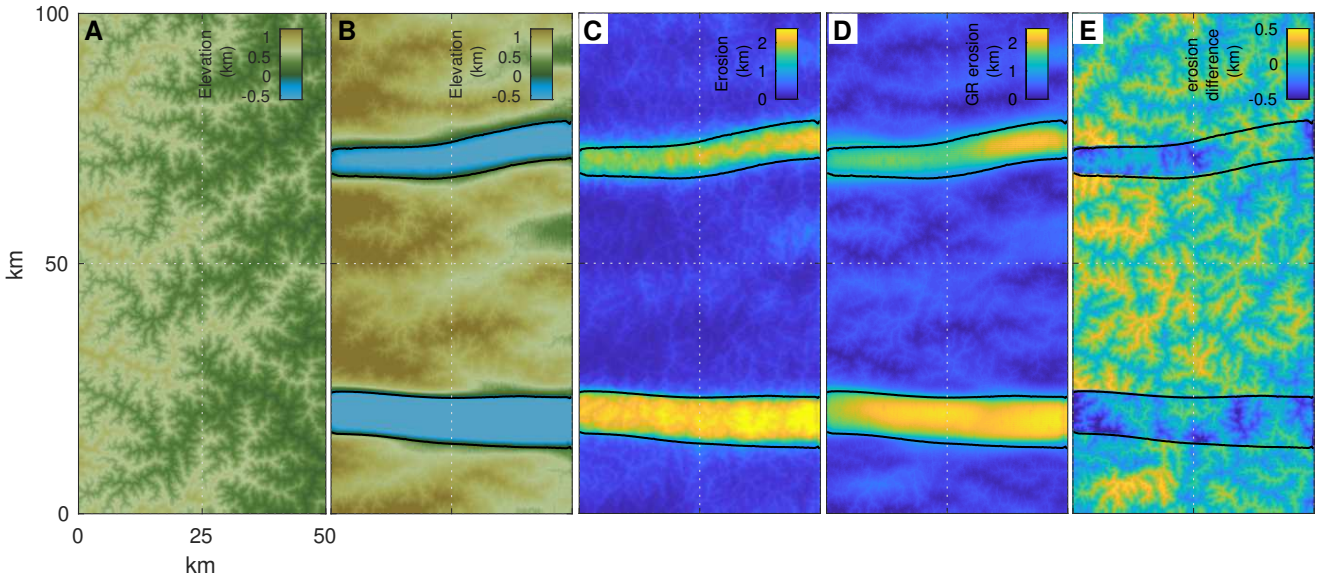

Figure DR1. We test our geophysical relief approach using a synthetic fjord landscape, generated by a landscape evolution model (LEM), including a higher-order ice-sheet model and glacial erosion (model previously published in Egholm et al., 2017). **A**, Initial synthetic fluvial landscape. **B**, Final glacially-modified fjord landscape, after a total of 700 kyr of simulated glacial erosion under an ice sheet. **C**, Total erosion as predicted by the LEM. **D**, Total erosion estimated using the geophysical relief method on the modelled glacial landscape in **B**. A radius of 5 km was used for the entire domain, reflecting the size of the fjords developed by the LEM. **E**, Difference between the total erosion as predicted by the LEM (**C**) and GR erosion (**D**). Despite local differences of some hundreds of meters, the total erosion estimated by the geophysical relief method fits the total erosion predicted by the LEM within ~6%. Fjord outlines are shown by black contours, and represent regions below sealevel in the end of the model simulation.

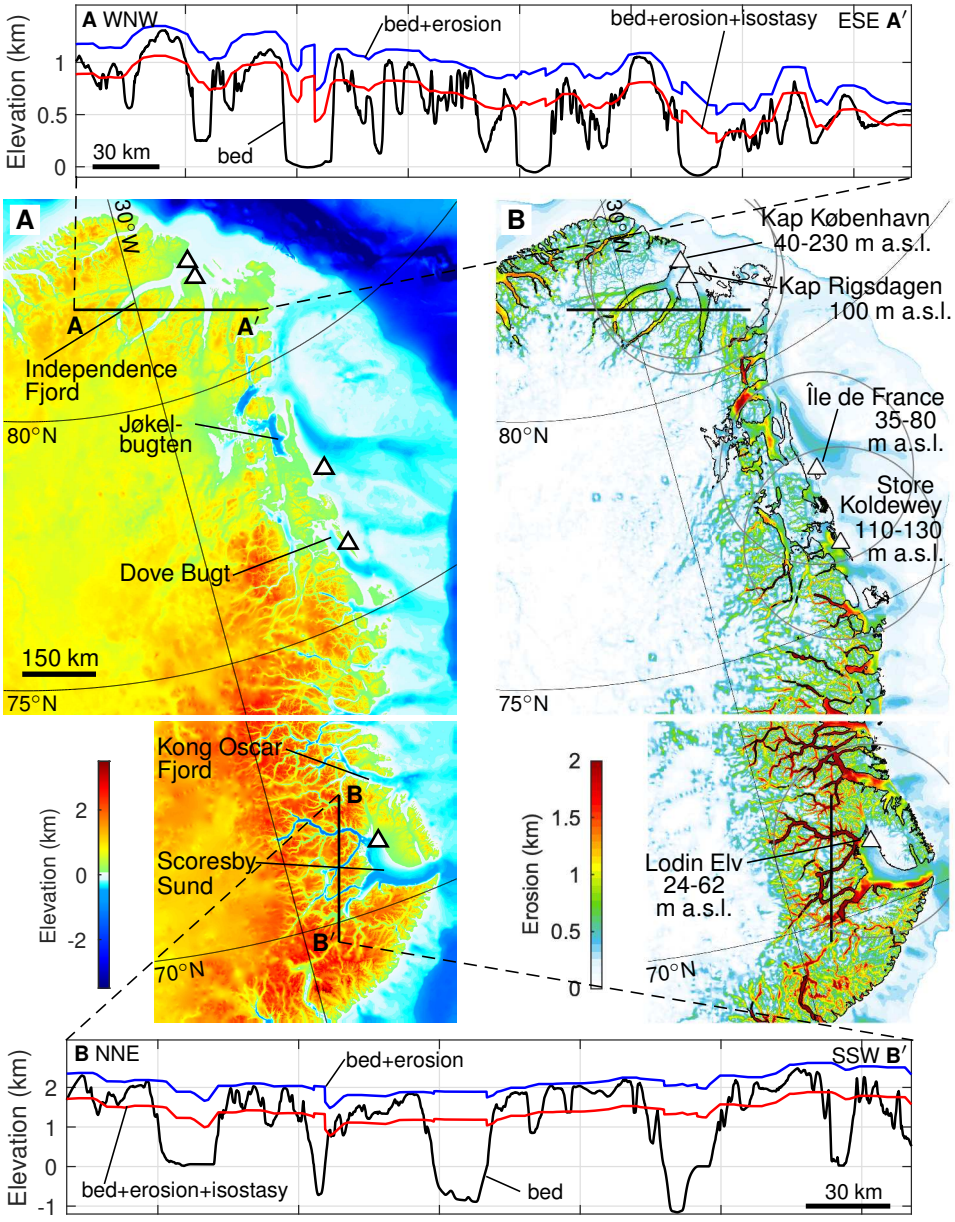

Figure DR2. Rebounded subglacial topography and glacial erosion in N and NE Greenland, using an EET of 40 km. **A**, Subglacial topography from Bedmachine V3 (Morlighem et al., 2017), isostatically corrected for the loading of the present ice sheet. **B**, Estimated erosion using the geophysical relief method (see main text). Shown are also localities and present elevations for the KKF and similar successions. Gray circles illustrate the contributing area for erosion-induces isostatic uplift for each locality, with the radius defined as the half-width of an analytical line-load depression (Turcotte and Schubert, 2002), for EET= 40 km. The two profiles (AA' and BB') show i) rebounded subglacial topography (black), ii) rebounded subglacial topography with added erosion (blue), and iii) rebounded subglacial topography with added erosion and the flexural isostatic response to erosion (red), for the Independence Fjord system and Scoresby Sund, respectively.

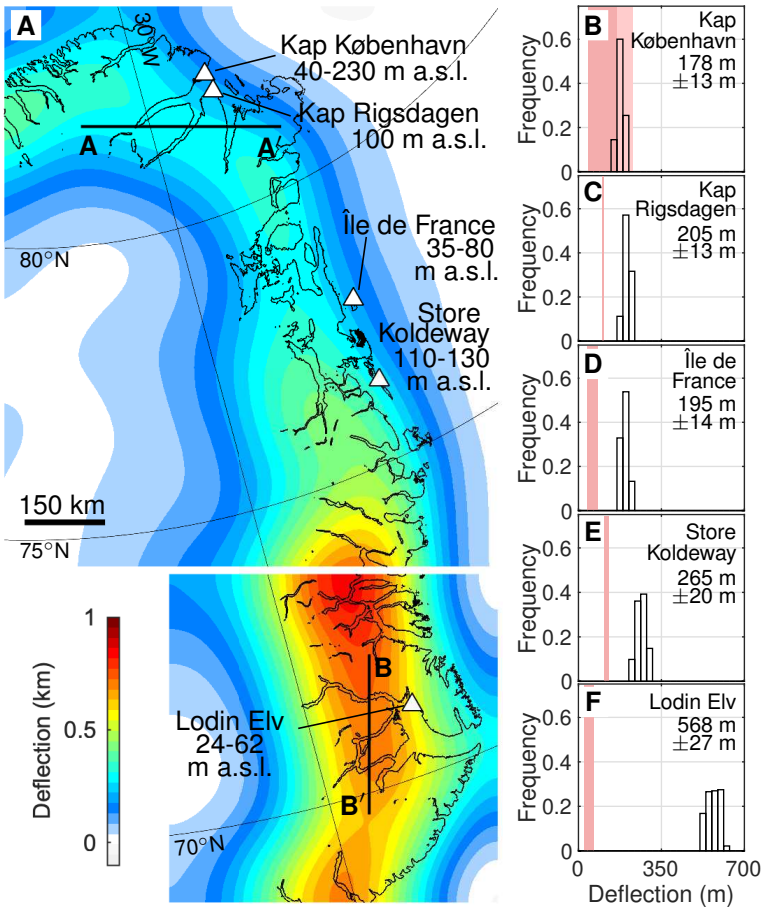

Figure DR3. Erosion-driven flexural isostatic uplift, using an EET of 40 km. **A**, Deflection of the lithosphere owing to erosional unloading in N and NE Greenland. **B-F**, Present elevation of the KKF and related sequences (red bands), compared to the deflection distribution in a 30-by-30 km window around the localities (histograms). Mean and standard deviation are indicated for the deflection distributions. Note for the KKF, the light red color indicates observations, which might reflect post-depositional glaciotectonic dislocation (Funder et al., 1984), although most sections are undisturbed sediment successions (Bennike, 1990).

REFERENCES

Bennike, O., 1990, The Kap København Formation: stratigraphy and palaeobotany of a Plio-Pleistocene sequence in Peary Land, North Greenland: Meddelelser om Grønland, v. 23, p. 3-85.

Egholm, D.L., Jansen, J.D., Brædstrup, C.F., Pedersen, V.K., Andersen, J.L., Uglevig, S.V., Larsen, N.K., Knudsen, M.F., 2017, Formation of plateau landscapes on glaciated continental margins: Nature Geoscience, v. 10, p. 592-597, https://doi.org/10.1038/ngeo2980.

Funder, S., Bennike, O., Mogensen, G.S., Noe-Nygaard, B., Pedersen, S.A.S., Petersen, K.S., 1984, The Kap København Formation, a late Cainozoic sedimentary sequence in North Greenland: Grønlands Geologiske Undersøgelse, v. 120, p. 9-18.

Morlighem M. *et al.*, 2017, BedMachine v3: Complete bed topography and ocean bathymetry mapping of Greenland from multi-beam echo sounding combined with mass conservation: Geophysical Research Letters, v. 44, p. 11,051-11,061, doi:10.1002/2017GL074954.

Turcotte, D.L., Schubert, G., 2002, Geodynamics (second edition): Cambridge University Press, 456 p.