Supplementary figures for
'The impact of landfast sea ice buttressing on ice dynamic speedup in the Larsen-B Embayment, Antarctica'

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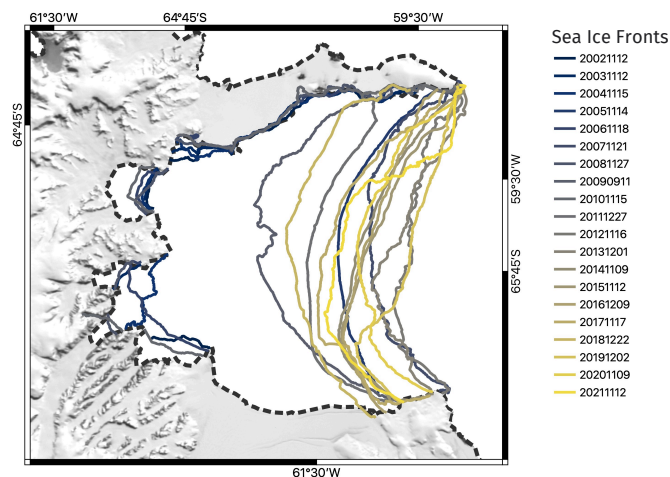
Figure S1. Annual sea ice front locations in the Larsen-B Embayment delineated from multi-spectral optical Landsat-8 imagery and Sentinel-1 synthetic aperture radar backscatter imagery between November 2002 and November 2021. The basemap is the MODIS Mosaic of Antarctica (Haran et al., 2021) and the black dashed line is the coastline according to MEaSUREs (Mouginot et al., 2017).
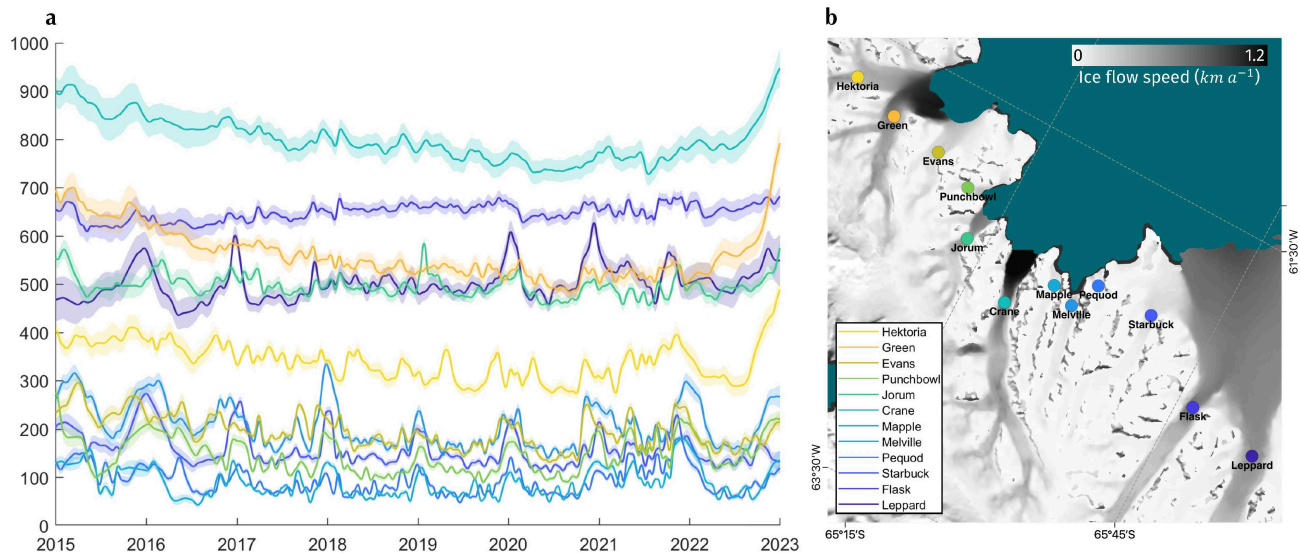
Figure S2. Timeseries of speed on the Larsen-B Glaciers. a) Timeseries of ice flow speed for 12 glaciers flowing into the Larsen-B Embayment between January 2015 and December 2022 from data made using Interferometric Wide (IW) mode synthetic Aperture Radar (SAR) data acquired by the Sentinel-1a/b satellites. Each datapoint is the mean speed over a 1 km-long segment of a flowline located on the corresponding glacier. A Kalman smoother was used along with a 30-day moving average to smooth the data. The uncertainties shown are 1σ either side of the mean. b) Coloured circles represent the centre points of the 1 km-long flowline segments used to extract the timeseries in (a) with corresponding colour. Greyscale colourmap: Inverse-error-weighted mean ice speed over the region, measured between October 2014 and April 2023. The sea is coloured dark green.
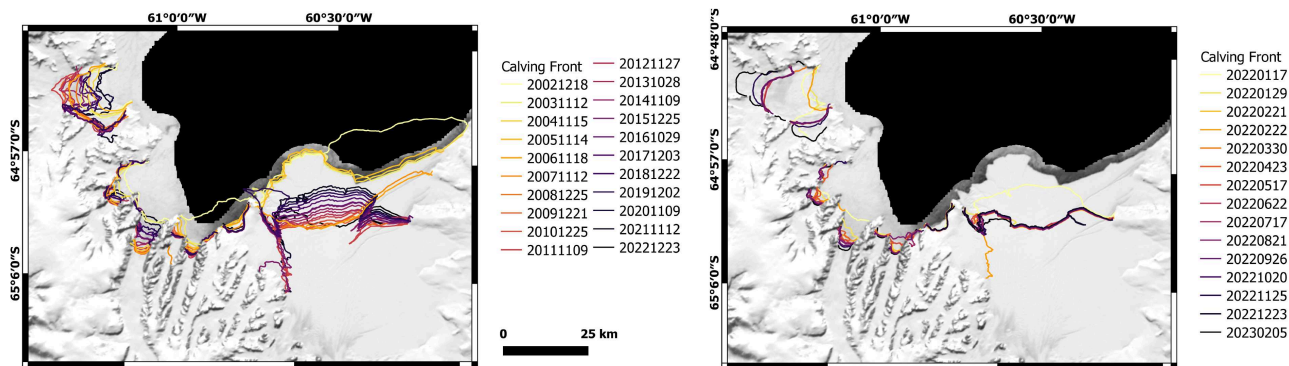
Figure S3. Calving front locations in the Larsen-B Embayment delineated from multi-spectral optical Landsat-8 imagery and Sentinel-1 synthetic aperture radar backscatter imagery. (a) annual calving front locations between December 2002 and December 2022. (b) monthly calving front locations between January 2021 and February 2023. The basemap is the MODIS Mosaic of Antarctica (Haran et al., 2021)
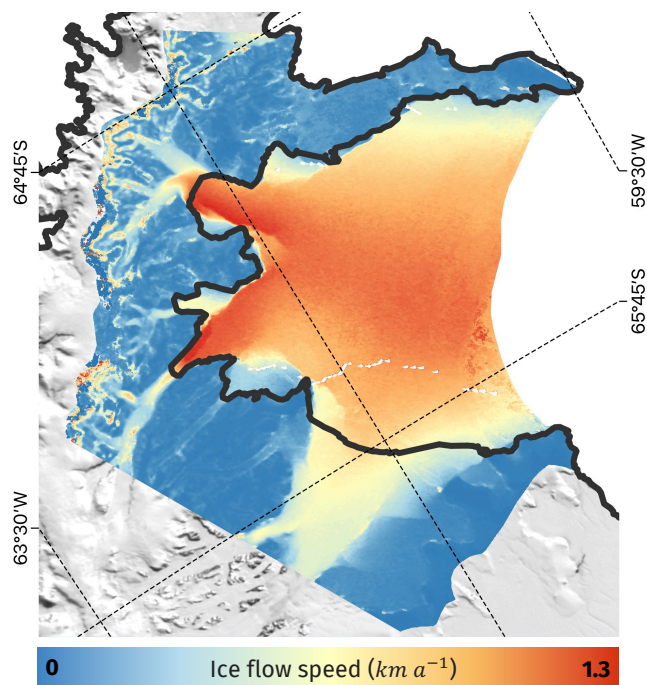
Figure S4. Median ice speed over the landfast sea ice in the Larsen-B Embayment measured between November 2015 and July 2017 using Interferometric Wide (IW) mode synthetic Aperture Radar (SAR) data acquired by the Sentinel-1a/b satellites. The basemap is the MODIS Mosaic of Antarctica (Haran et al., 2021) and the black line is the MEaSUREs coastline according to Mouginot et al. (2017)
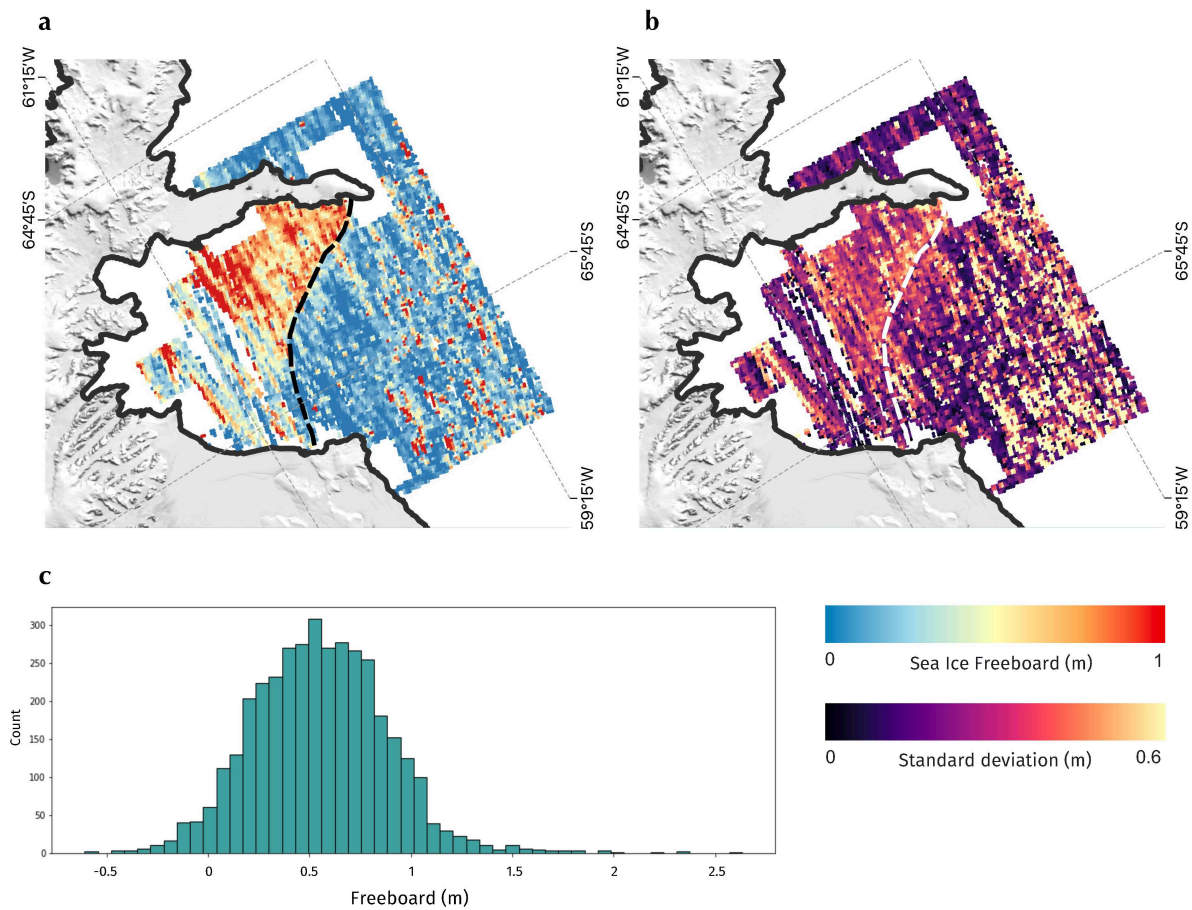
Figure S5. CryoSat-2 derived measurements of sea ice freeboard (Tilling et al., 2018). (a) Mean freeboard heights between 2013 and 2020. (b) Standard deviation of measured freeboard heights between 2013 and 2020. (c) Histogram of mean freeboard heights (shown in (a)) in the Larsen-B Embayment, landward of the edge of the landfast sea ice (black dashed line in (a), and the white dashed line in (b)). Basemaps show the MODIS MOA (Haran et al., 2021). The black line is the coastline according to MEaSUREs (Mouginot et al., 2017).

References

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