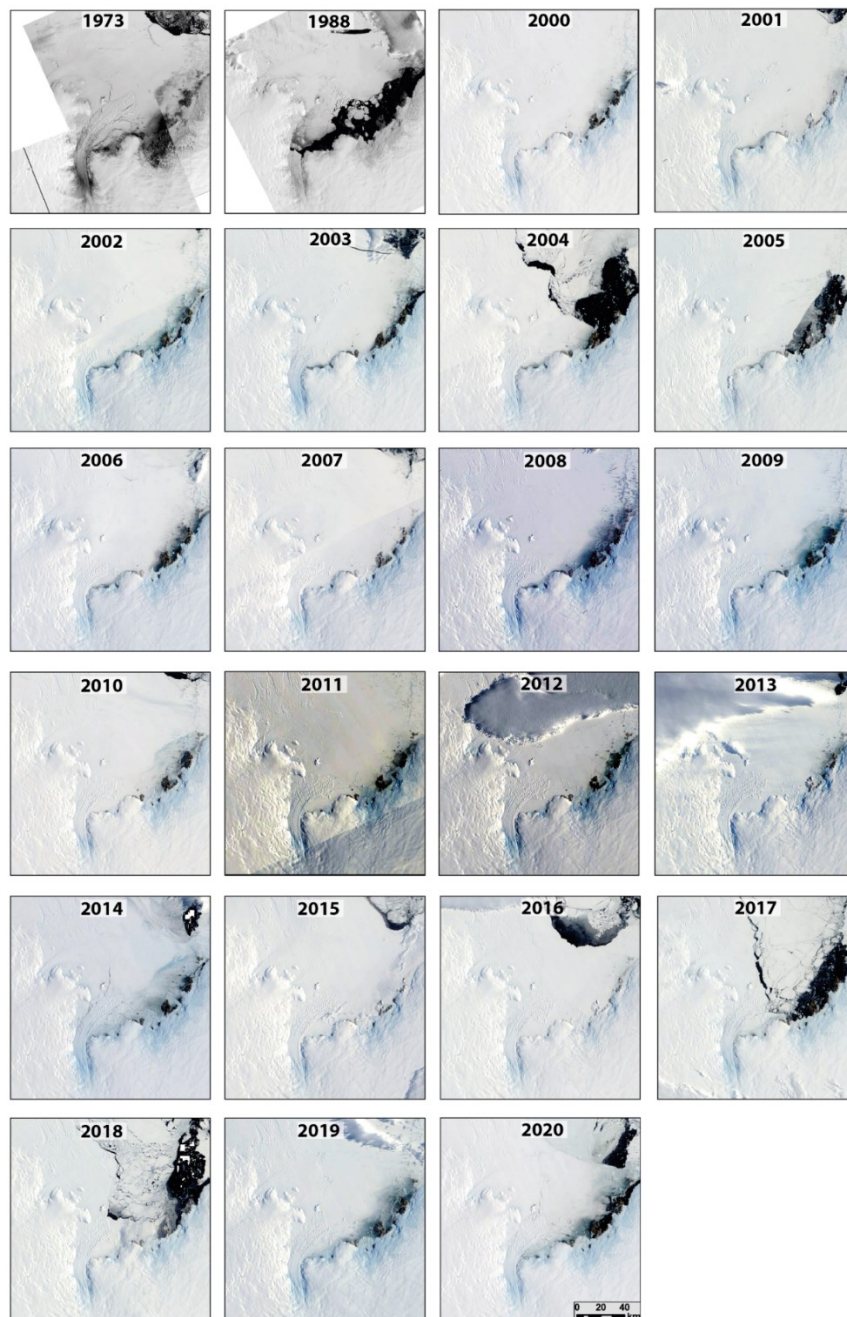


## *Supplementary Information*

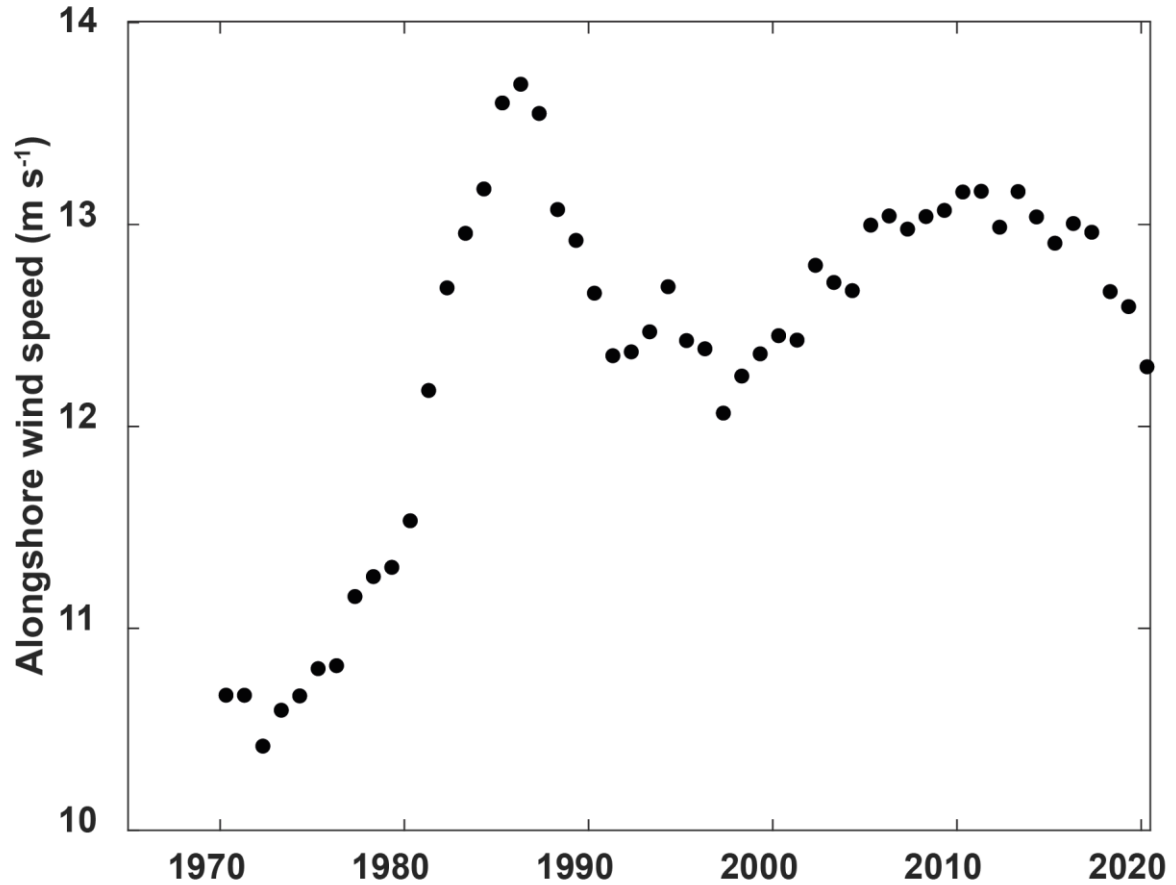
### **Slowdown of Shirase Glacier caused by strengthening alongshore winds**

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**Figure S1:** Landfast sea ice conditions in the Lützow-Holm Bay in all satellite imagery used in the study. The Landsat 1 and 4 images in 1973 and 1988 are taken in January and February respectively. The MODIS images between 2000 and 2020 all taken in March. Note the complete break-out of landfast sea-ice in 1988.



**Figure S2:** Annually averaged alongshore wind speeds recorded at the Syowa research station (see Fig.1 for location) plotted as a 5 year rolling mean.

**Animation S1:** This animation flicks between the Landsat-1 image pair used to extract ice speed from 1973/74. It shows a stable bedrock location in both images confirming the co-registration accuracy.

**Animation S2:** Same as Animation S1, except for the Landsat-4 image pair used to extract ice speed estimates from 1988

**Animation S3:** This animation flicks between the SPOT5 DEM from February 2008 and the REMA DEM from October 2015. Note the advance in the break-in-slope between 2008 and 2015. For reference we also include the MOA 2009 grounding line product as an approximation of the grounding line location.