

Supplementary Material: Assessment of Flow Dynamics in the Zone Close to the Calving Front of Antarctic Ice Shelves

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This supplementary material contains plots for 22 Antarctic ice shelves with each ice shelf assigned a separate page.

The top four plots show:

- the MODIS imagery used in the geophysical classification (Haran and others (2005)).
- the non-filtered ice-surface velocity field (450m resolution) for each ice shelf (using velocity dataset from Rignot and others (2011)).
- the along-flow strain rate calculated from the filtered velocity field (see below for filtering details). Additional black line indicates the flow line of maximum speed.
- the absolute transverse shear rate calculated from the filtered velocity field. This is displayed with a colour bar ranging from 0 - 0.05yr^{-1} , with saturated regions indicating values greater than 0.05yr^{-1} .

Each of these plots also includes a grounding line and coastline outline from MODIS (Haran and others (2005)).

The filtered velocity field used to calculate the along-flow strain rate and transverse shear rate is generated by applying a low-pass Gaussian filter to the original velocity field from Rignot and others (2011). We use the MATLAB *imfilter* function, with a Gaussian filter of size 9km (20 grid cells) and standard deviation 1.8km (4 grid cells). As a result of this filtering there are some artefacts in the along-flow strain rate and transverse shear rate plots. Valid values can be found 9km from the ice-ocean boundary.

Values of along-flow strain rate and speed sampled along the flow line of maximum velocity are displayed in the lower two plots. The upper of the two plots gives values of strain rate (blue) and speed (orange) along the full flow line transect, with the mean strain rate calculated over the final 20km shown as a thick green line. The lower plot displays the strain rate values from the final 20km section of the shelf (blue crosses), with the mean strain rate (bold green) and standard deviation in strain rate (dashed red). The methodology for calculating these quantities is given in the main text.

Acknowledgements

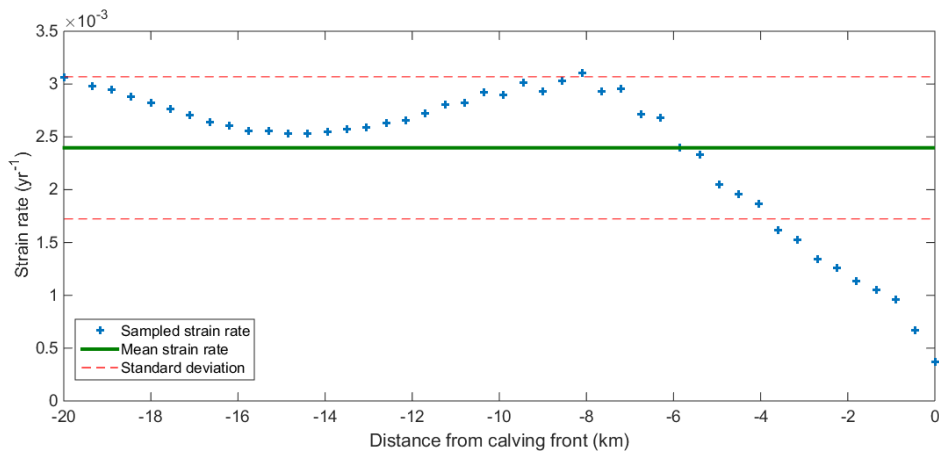
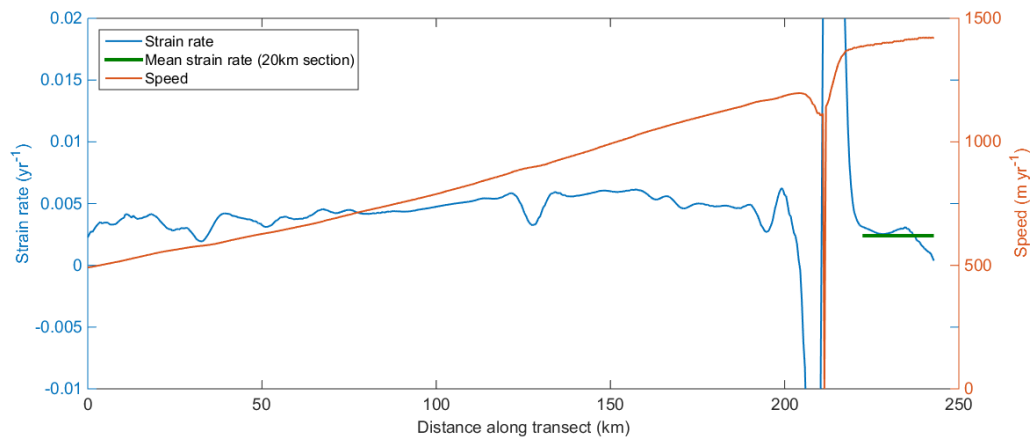
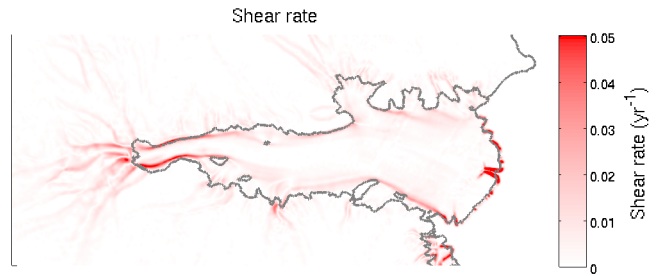
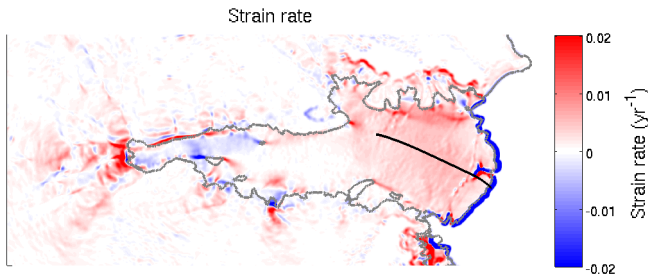
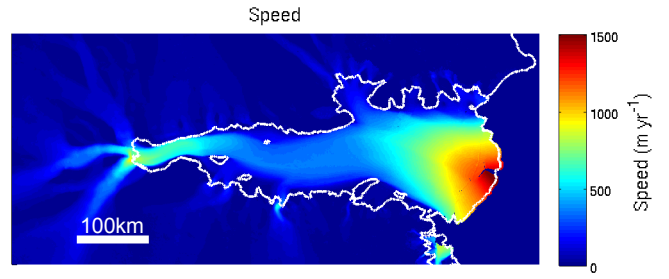
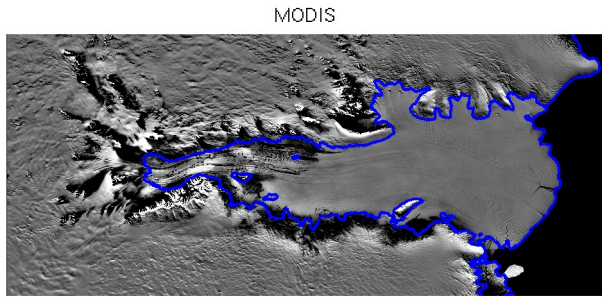
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References

Haran, T., J. Bohlander, T. Scambos, T. Painter and M. Fahnestock, 2005. MODIS Mosaic of Antarctica 2003-2004 (MOA2004) Image Map

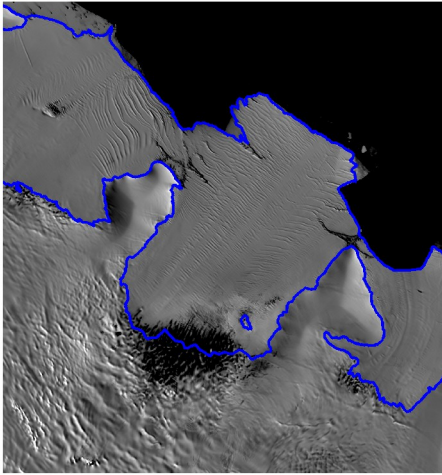
Rignot, E., J. Mouginot, and B. Scheuchl, 2011. MEaSURES InSAR-Based Antarctica Ice Velocity Map [450m]. Boulder, Colorado, USA: NASA DAAC at the National Snow and Ice Data Center.

Amery Ice Shelf

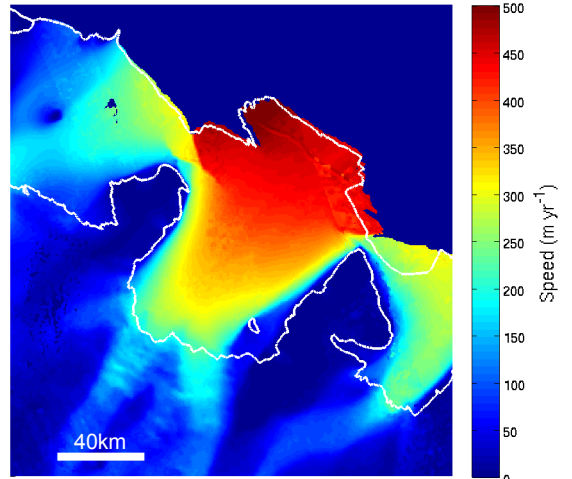


Borchgrevinkisen Ice Shelf

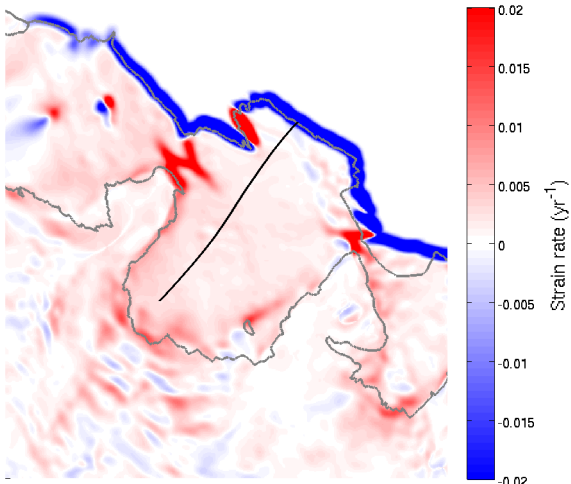
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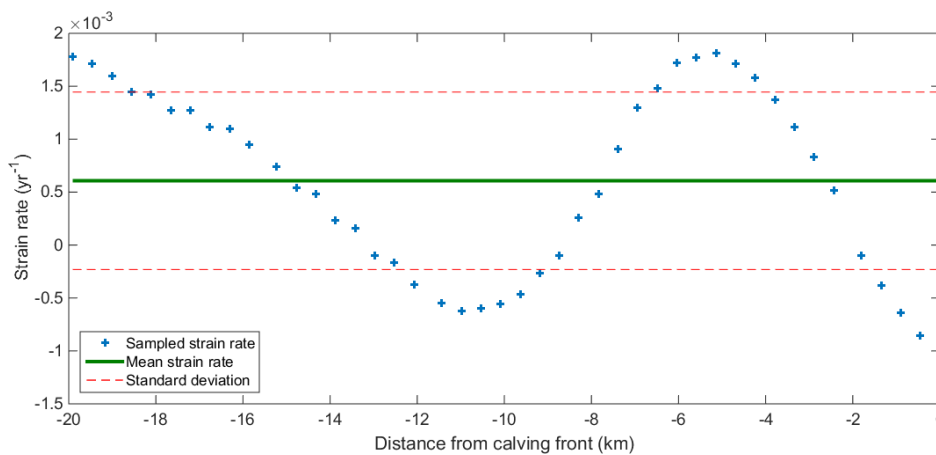
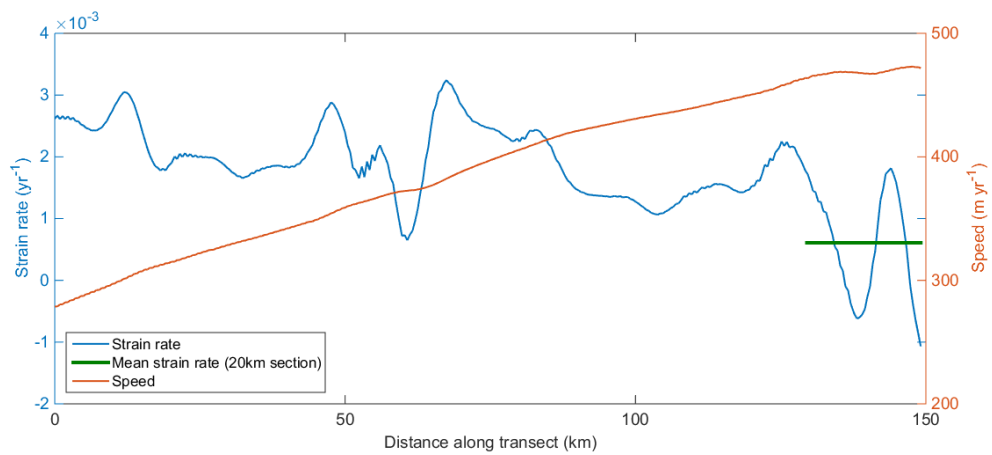
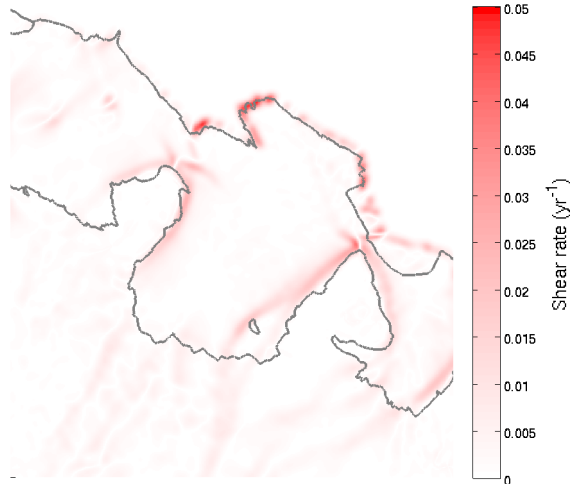
Speed



Strain rate

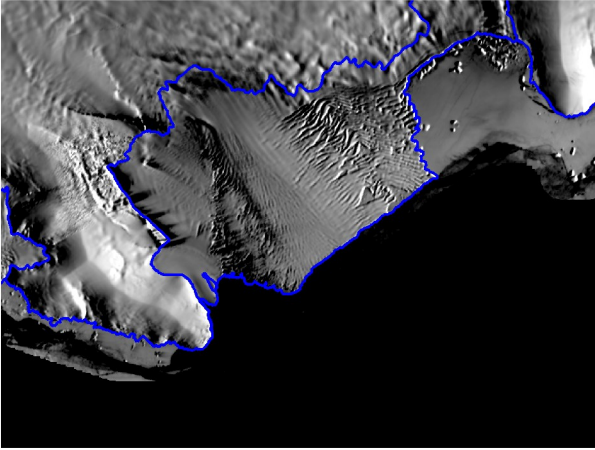


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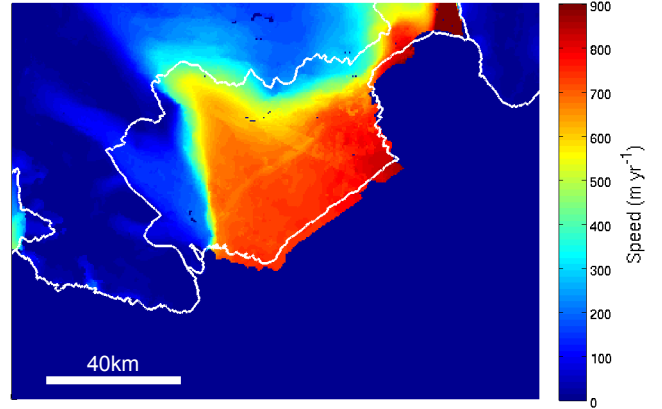


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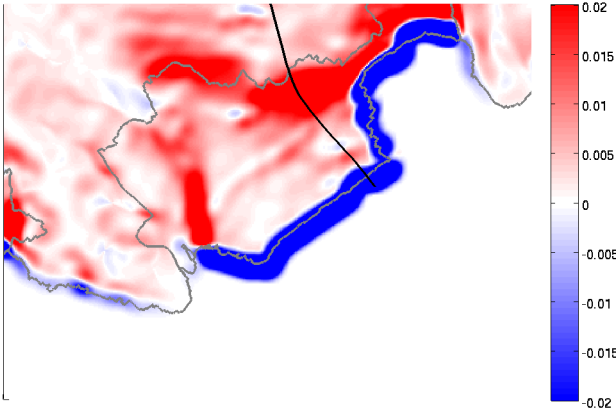
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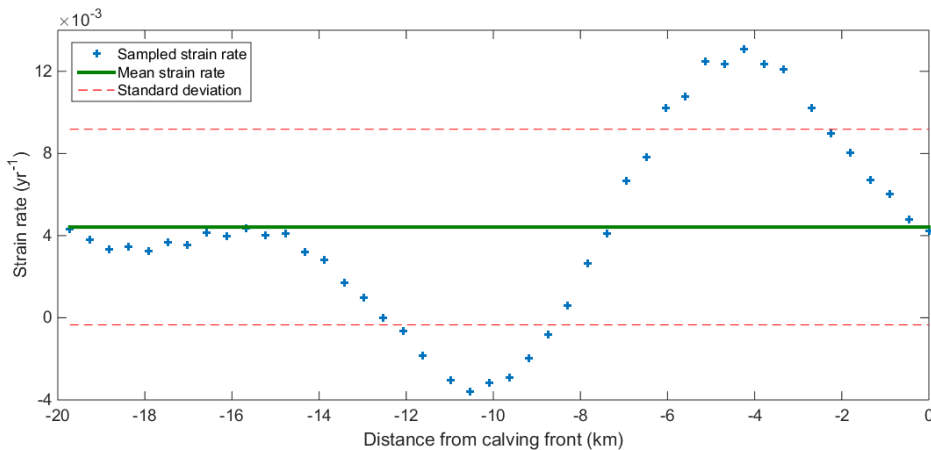
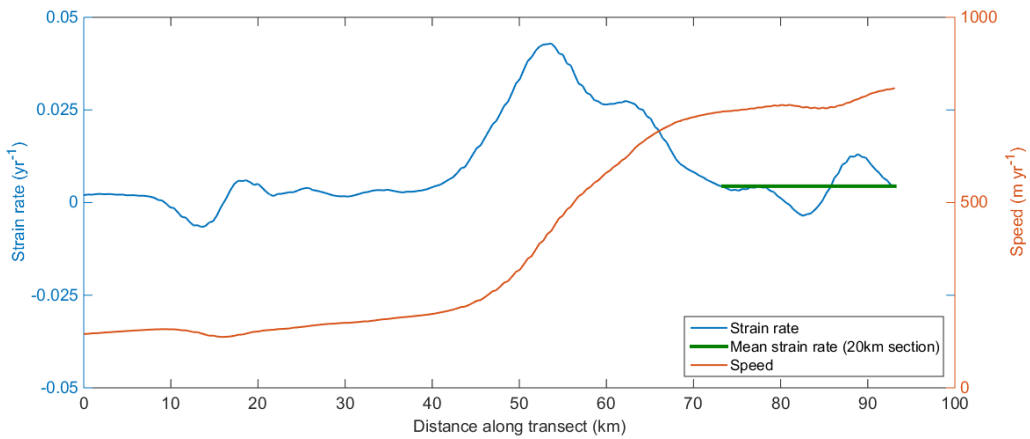
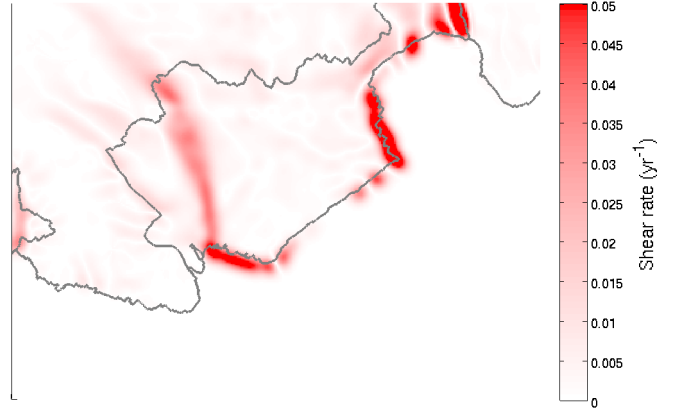
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Strain rate

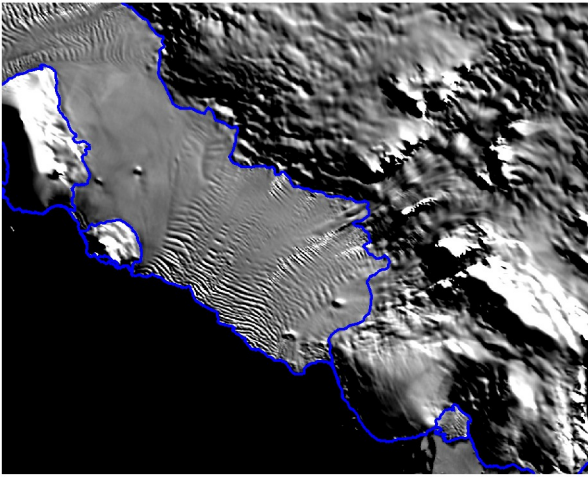


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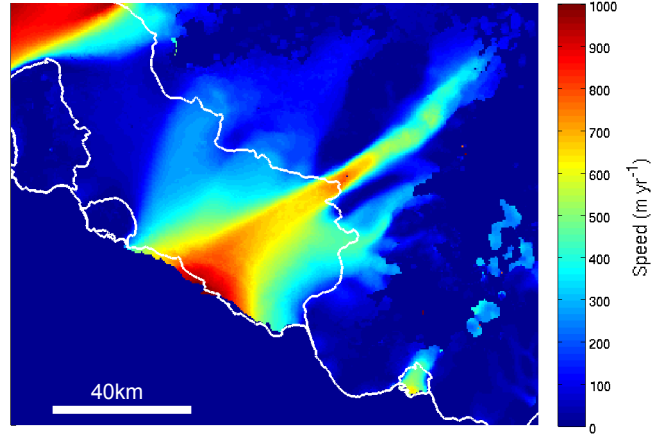


De Vicq A Ice Shelf

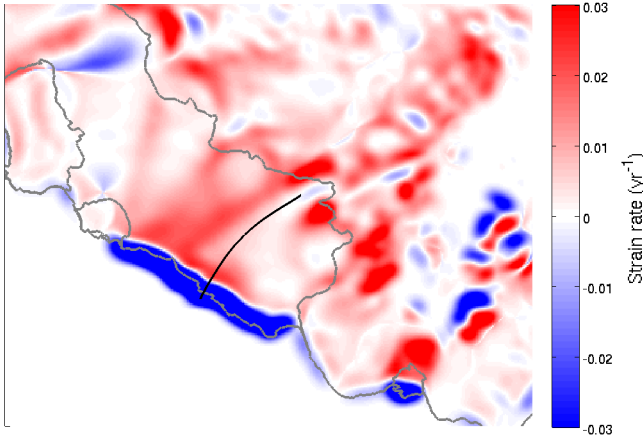
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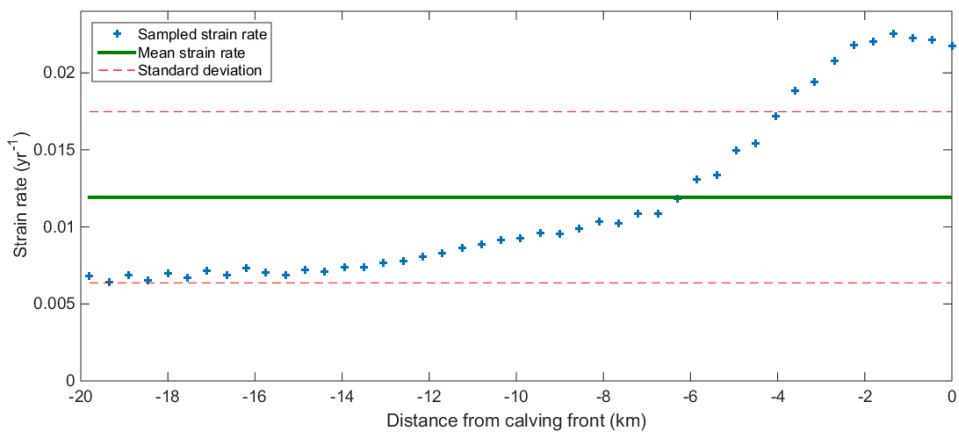
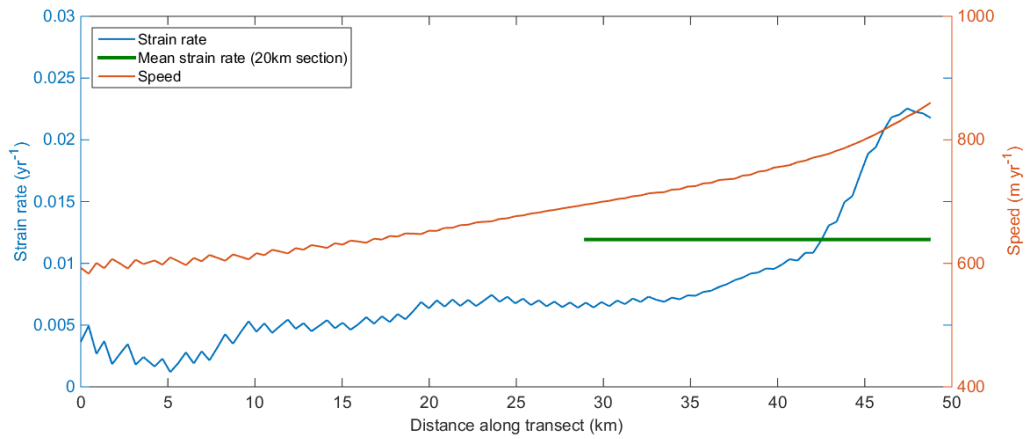
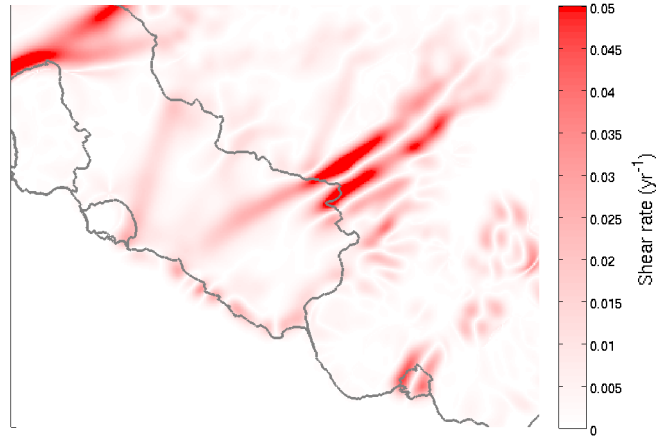
Speed



Strain rate

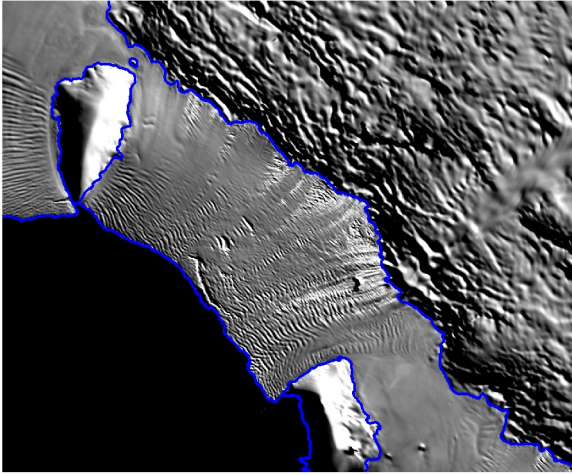


Shear rate

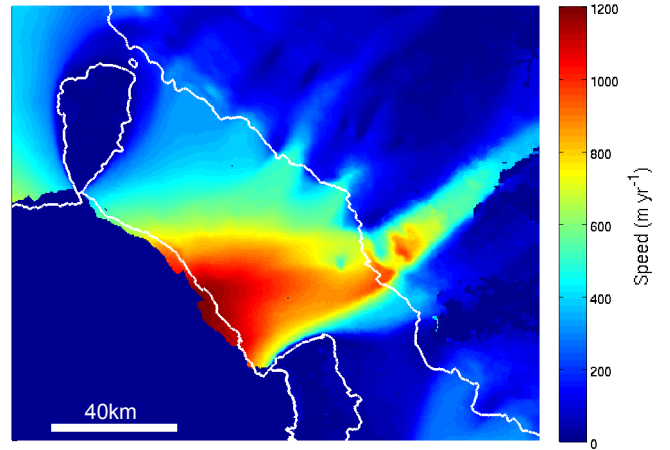


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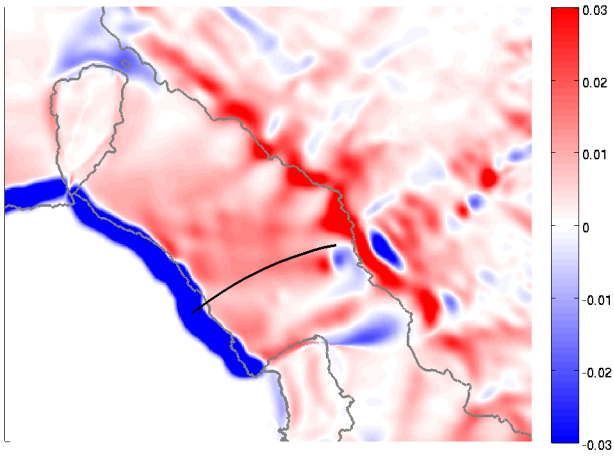
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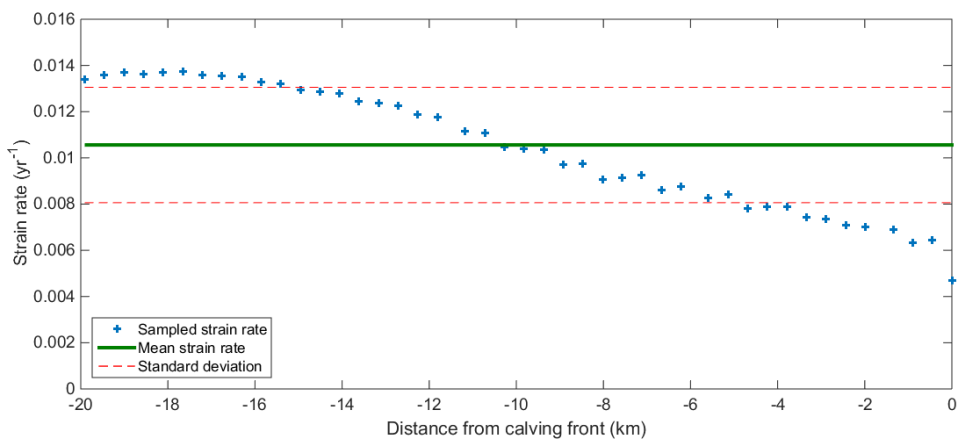
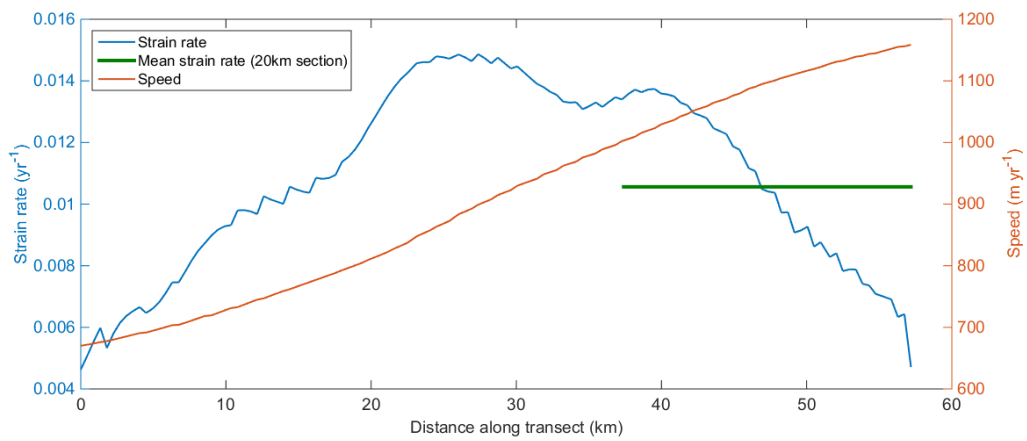
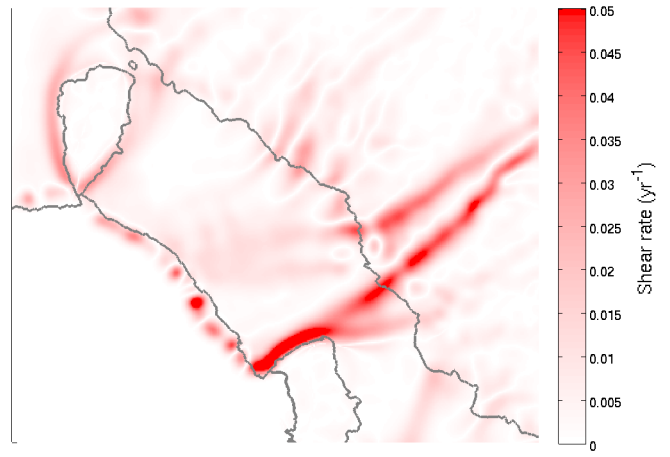
Speed



Strain rate

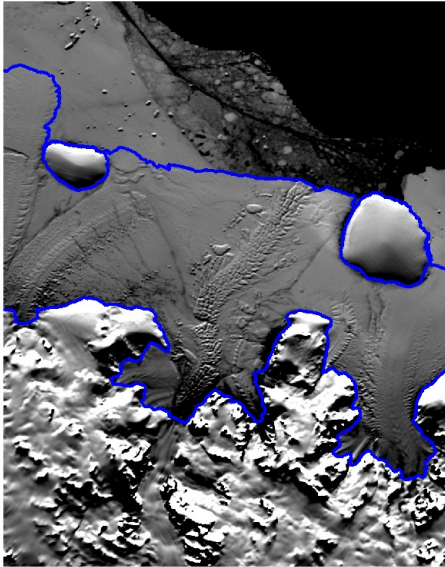


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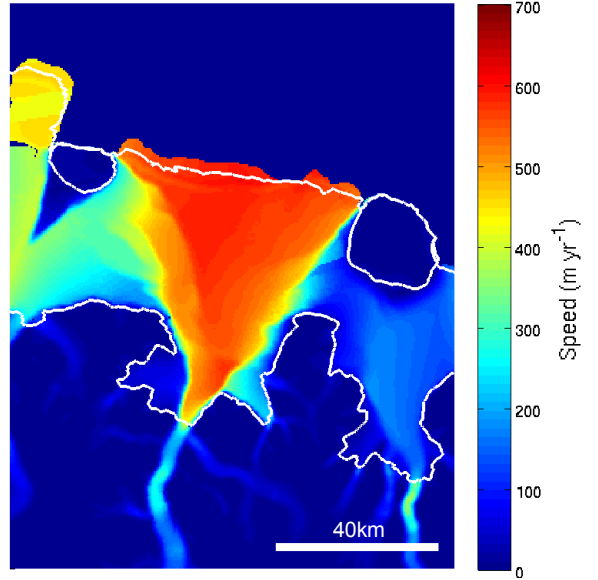


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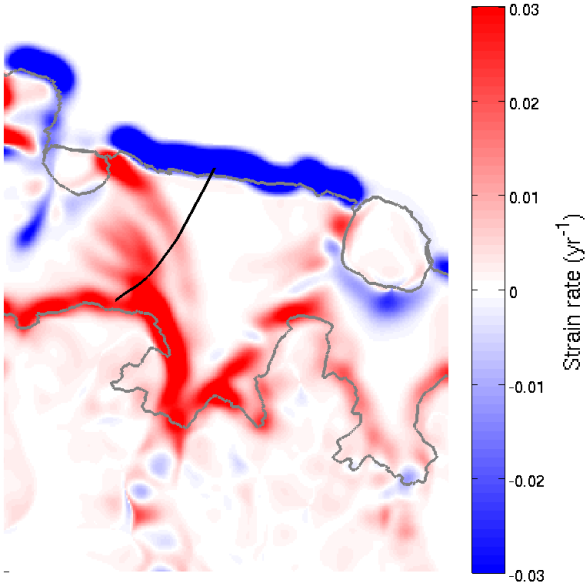
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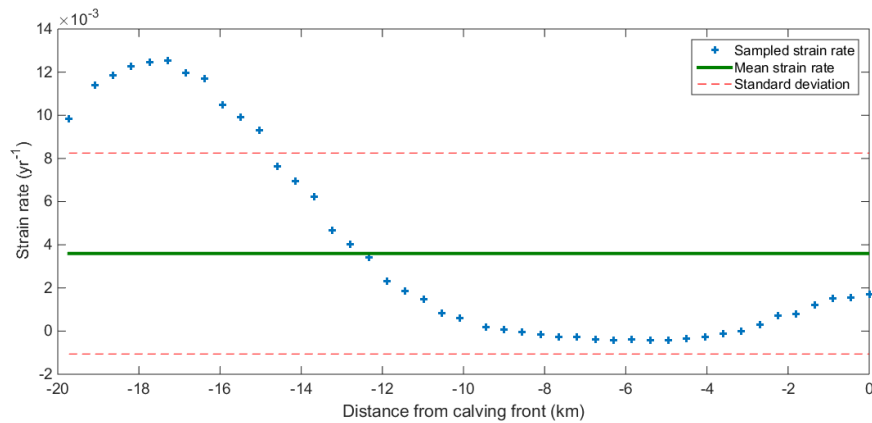
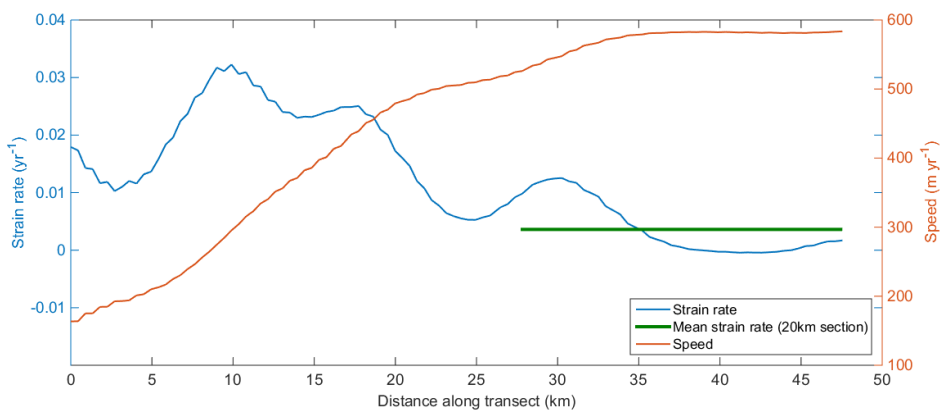
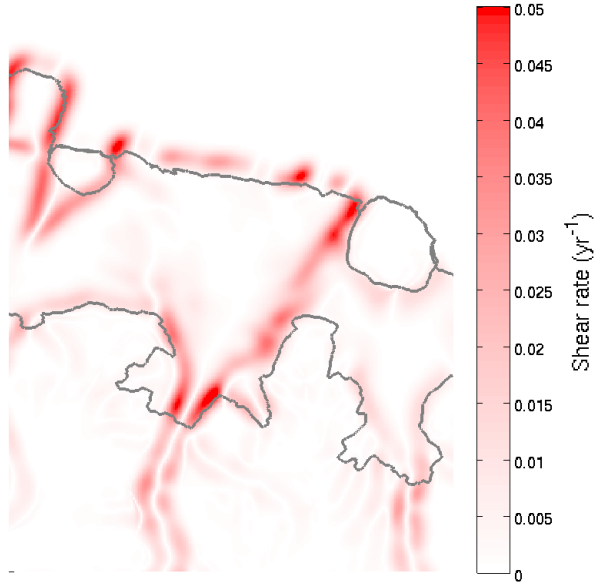
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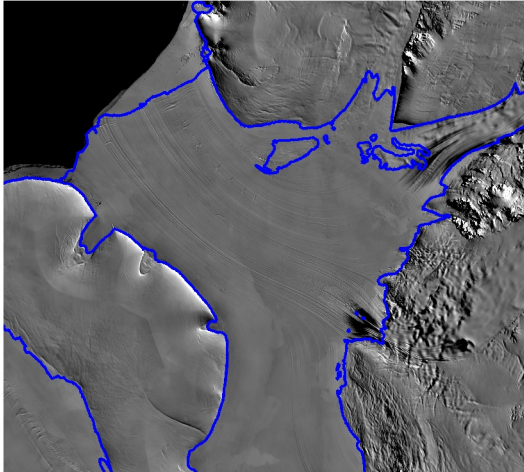


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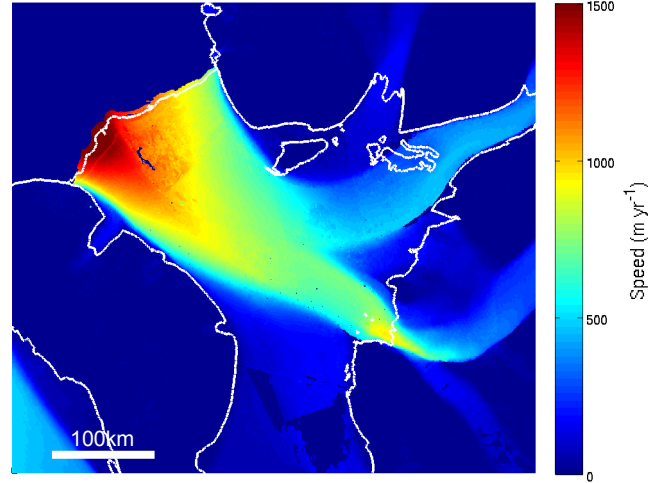


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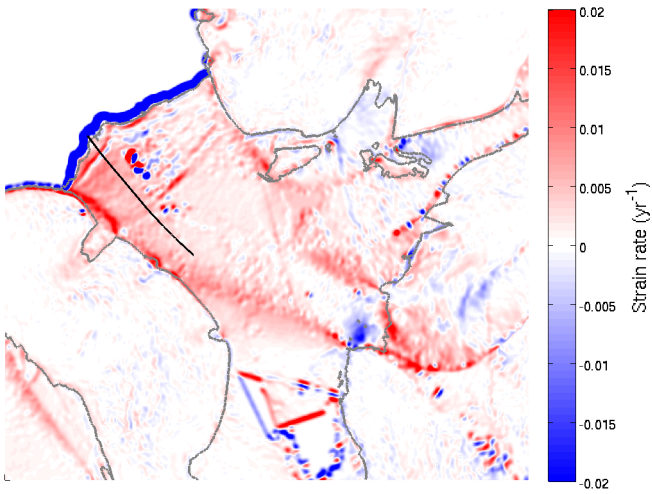
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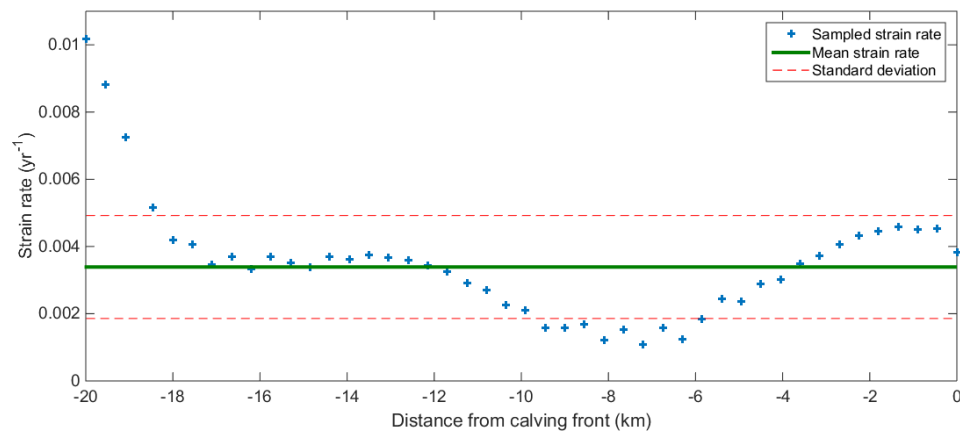
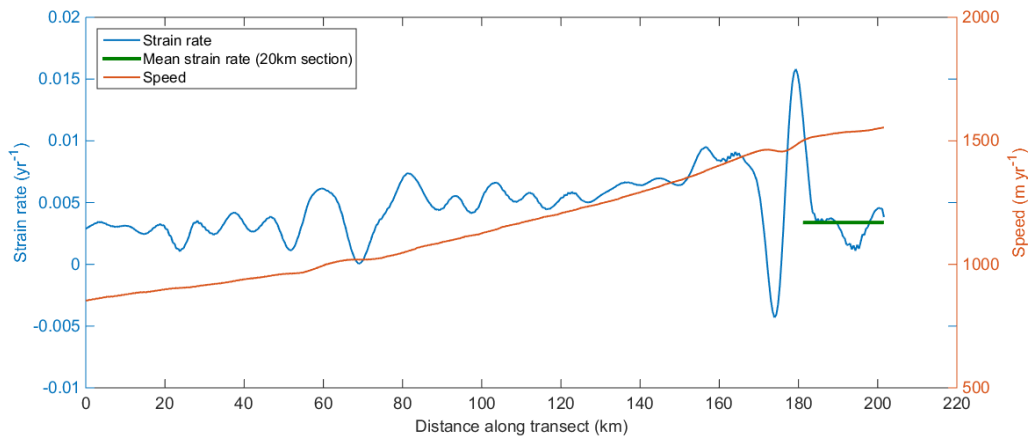
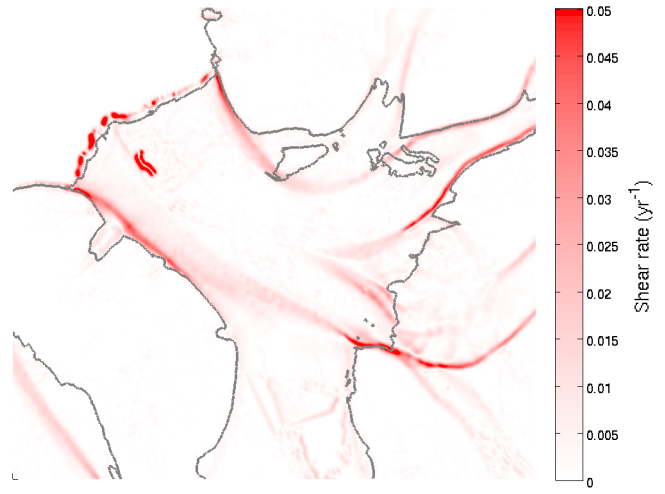
Speed



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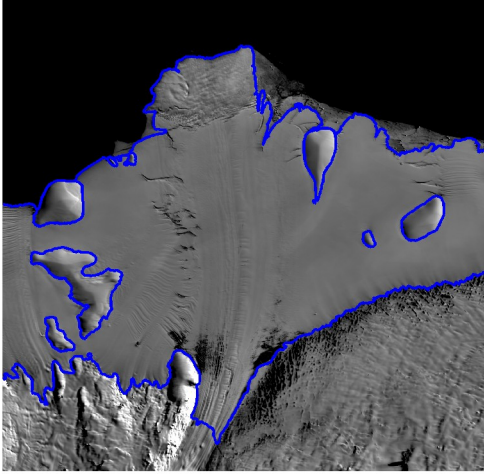


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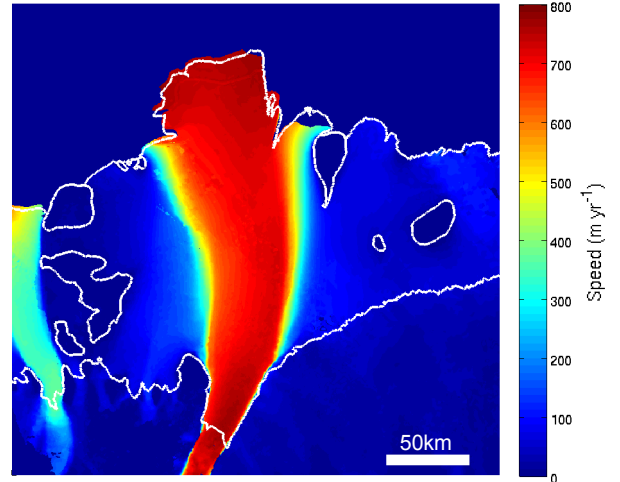


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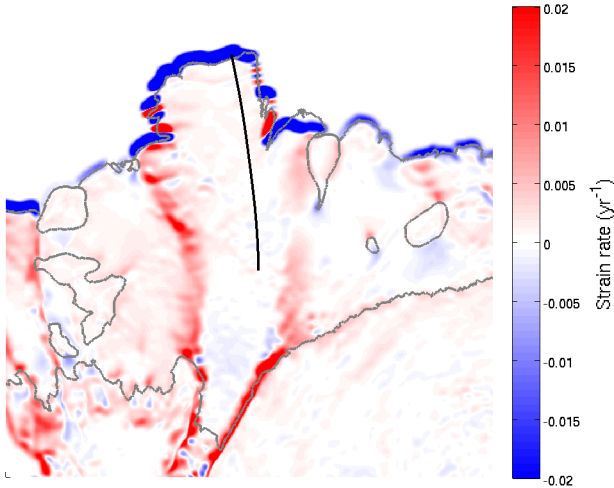
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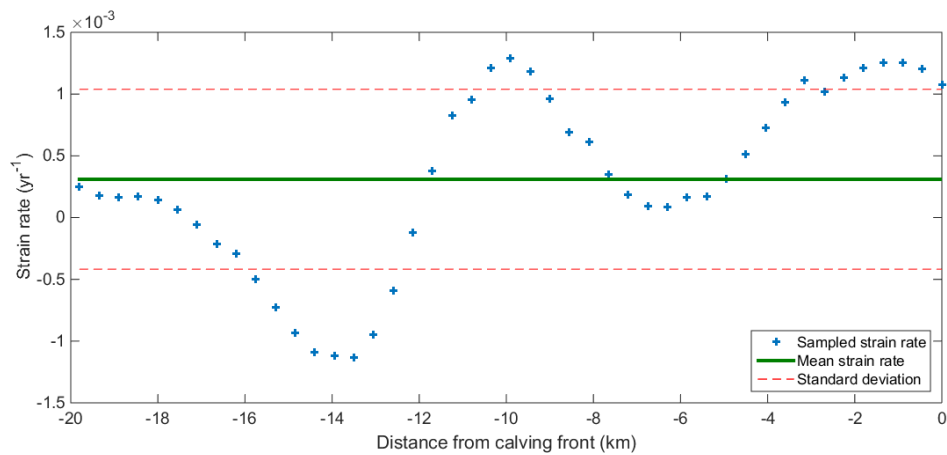
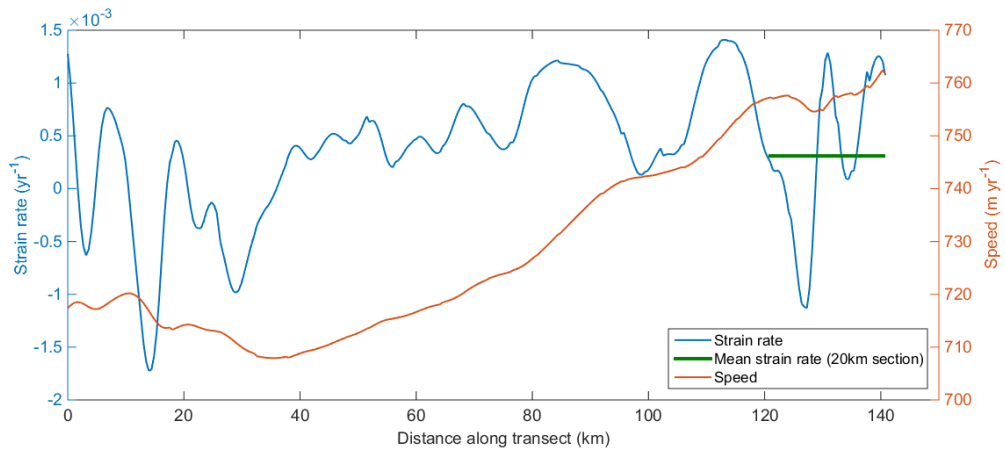
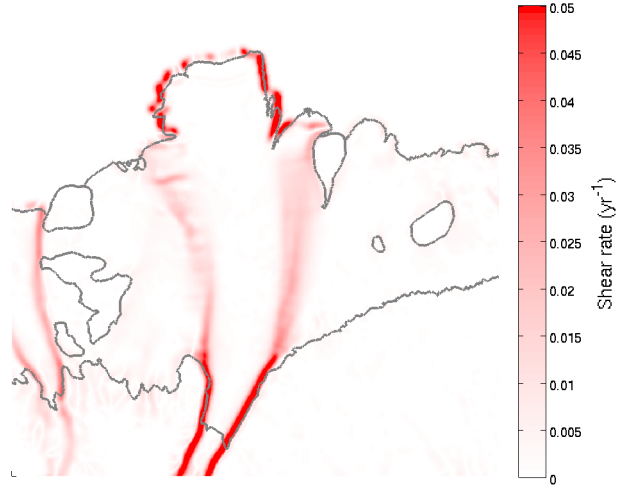
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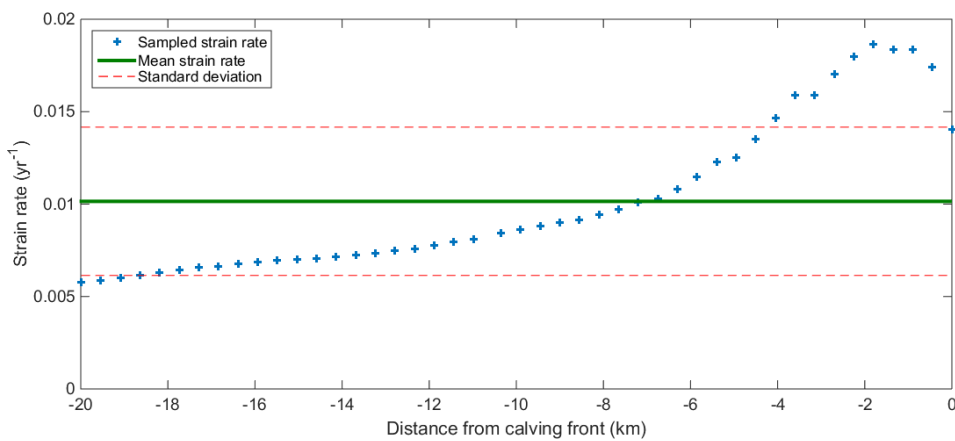
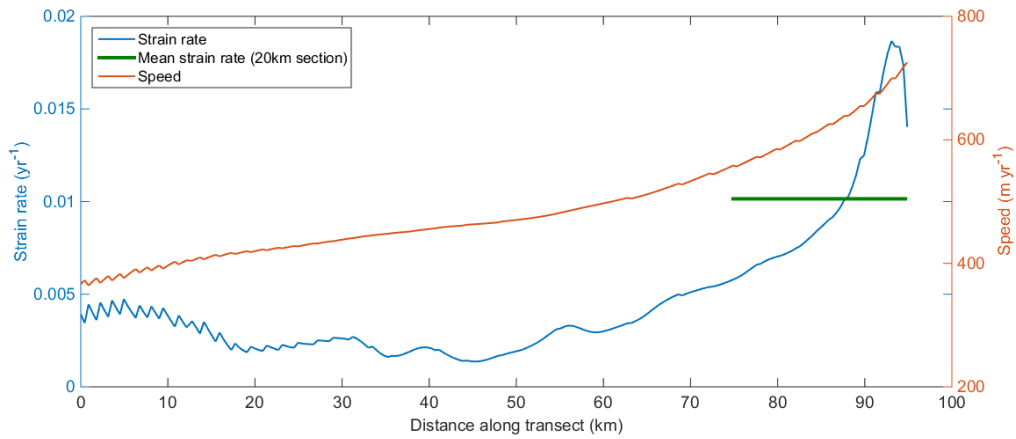
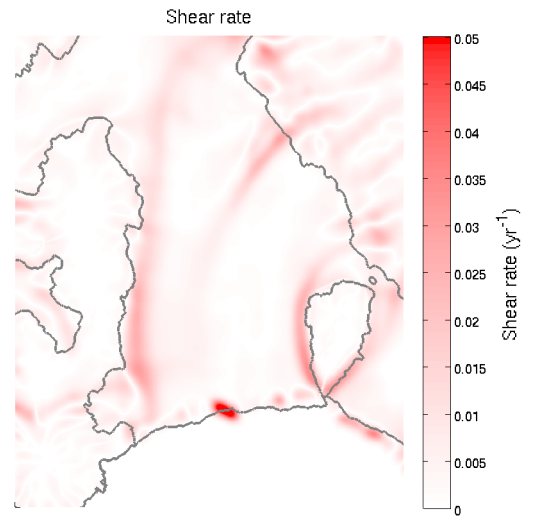
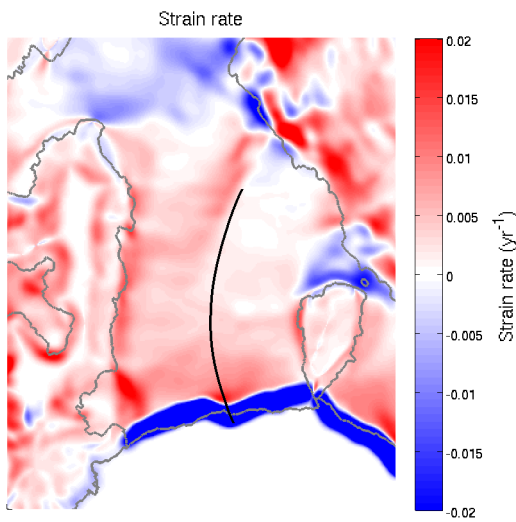
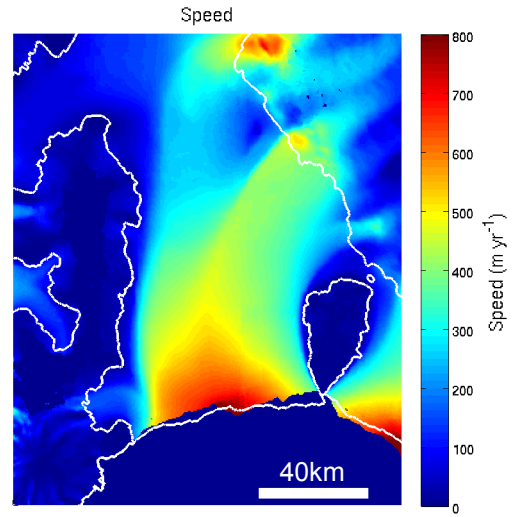
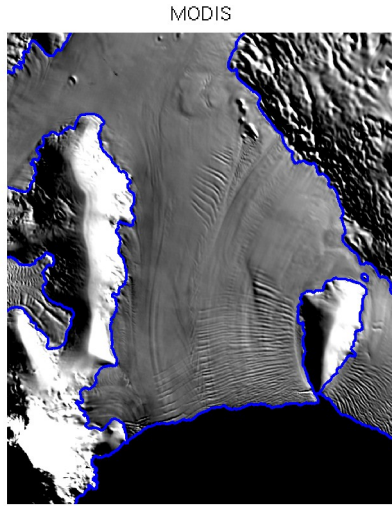
Strain rate



Shear rate

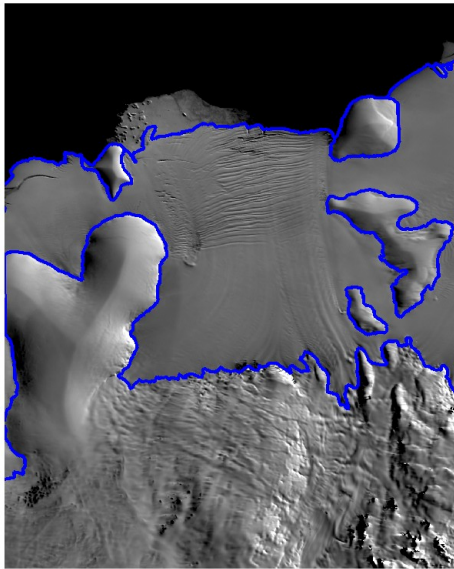


Getz Ice Shelf

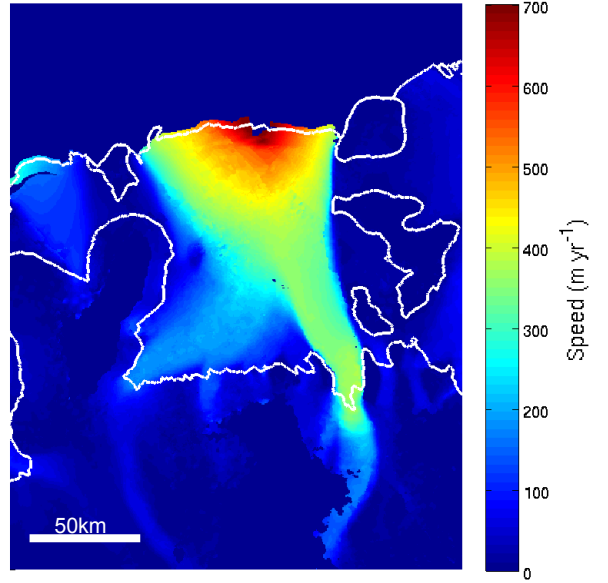


Jelbart Ice Shelf

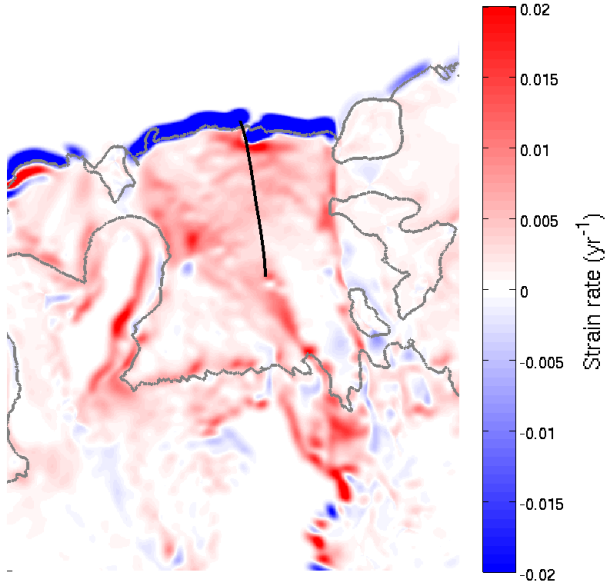
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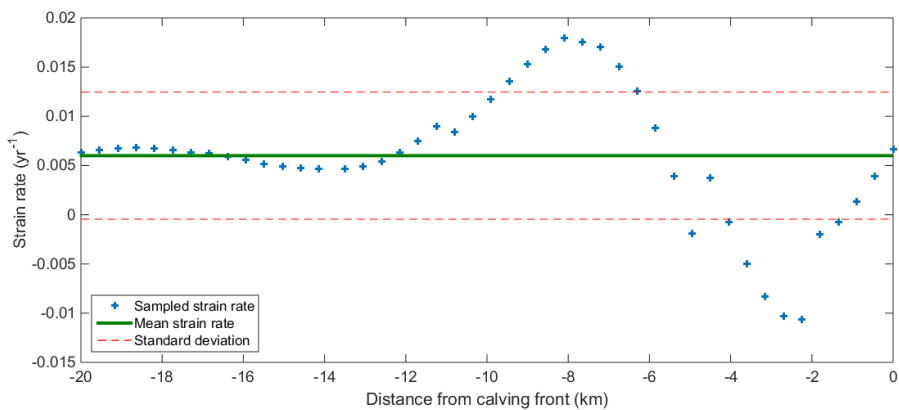
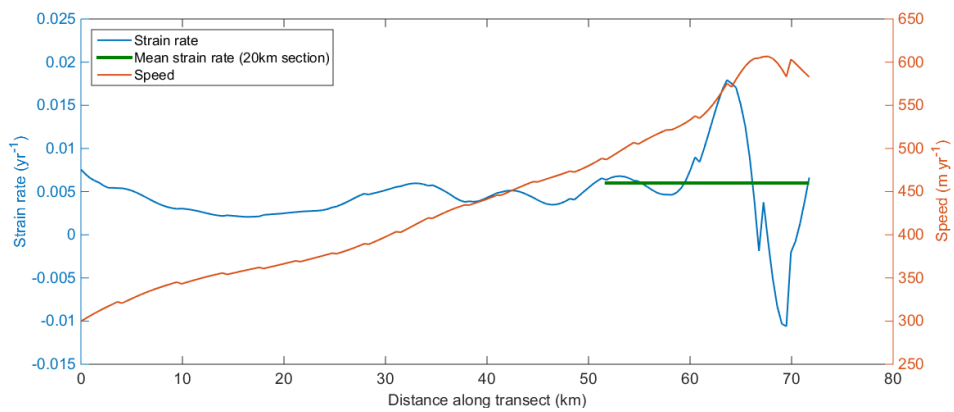
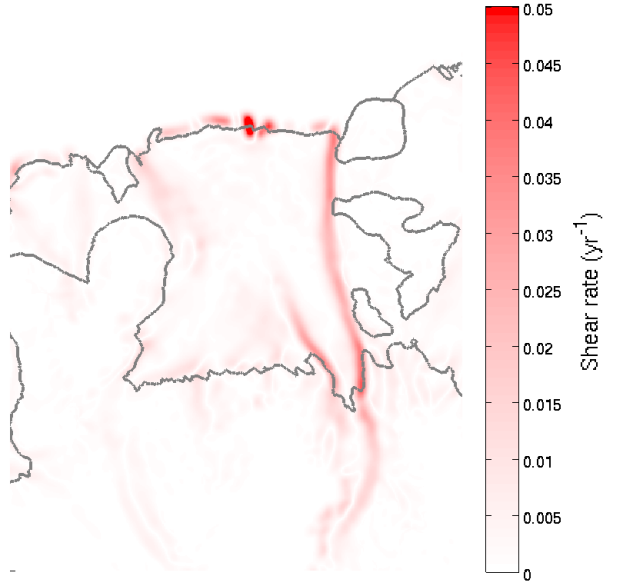
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Strain rate

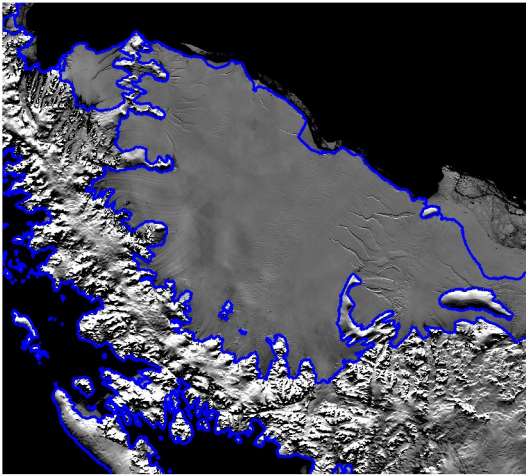


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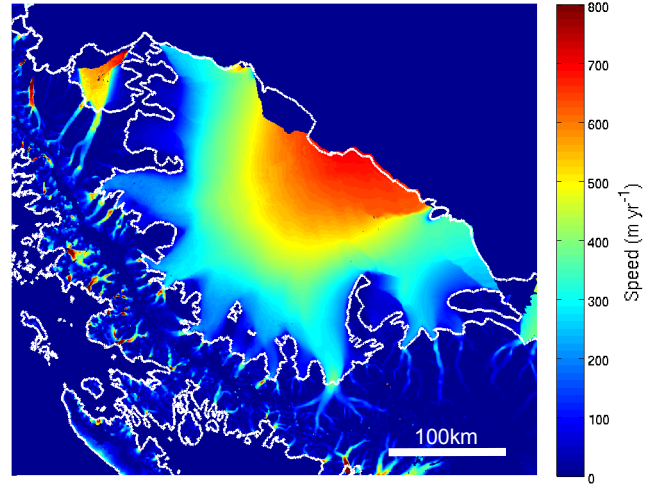


Larsen C Ice Shelf

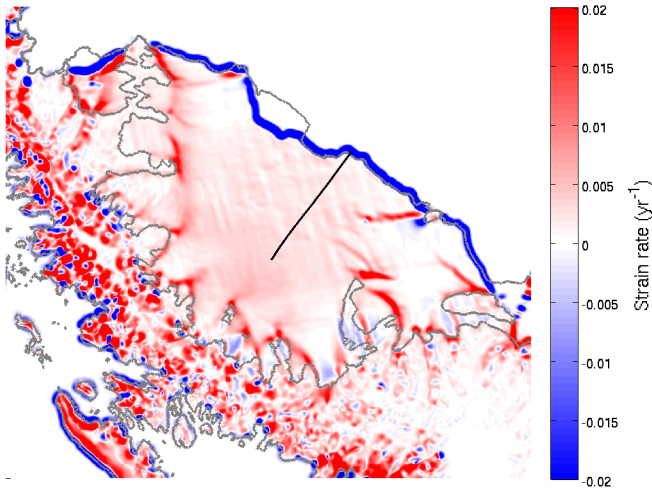
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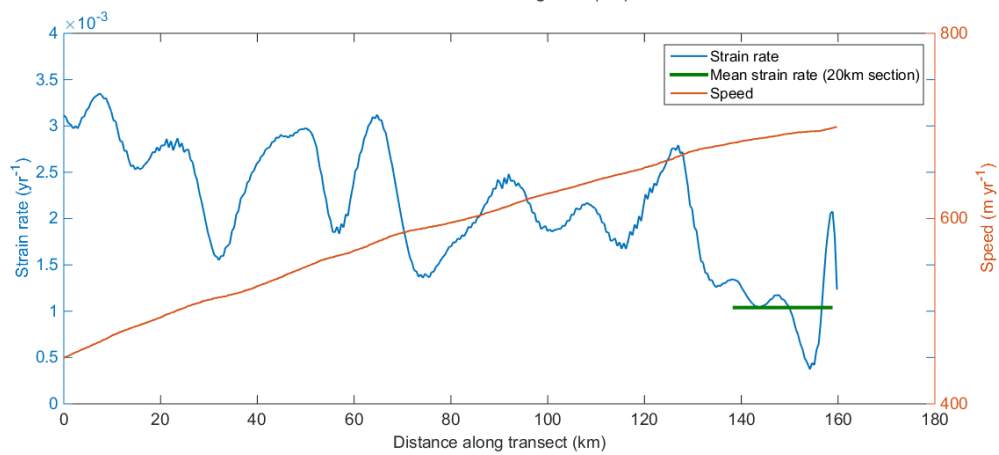
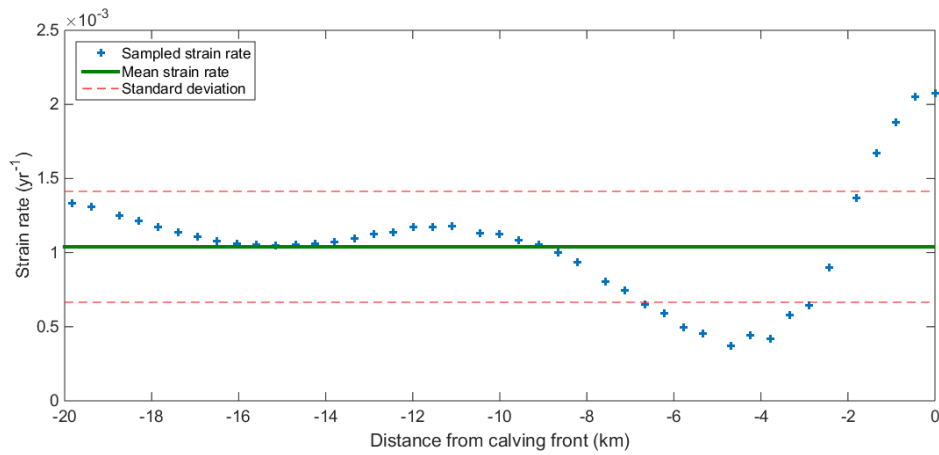
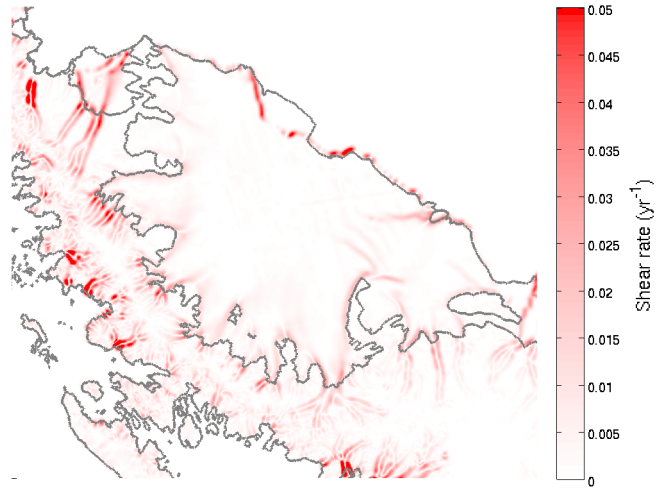
Speed



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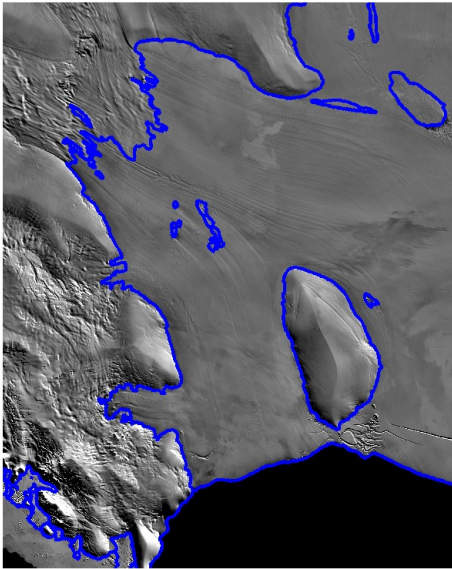


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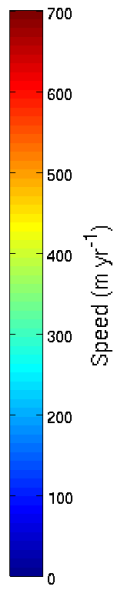
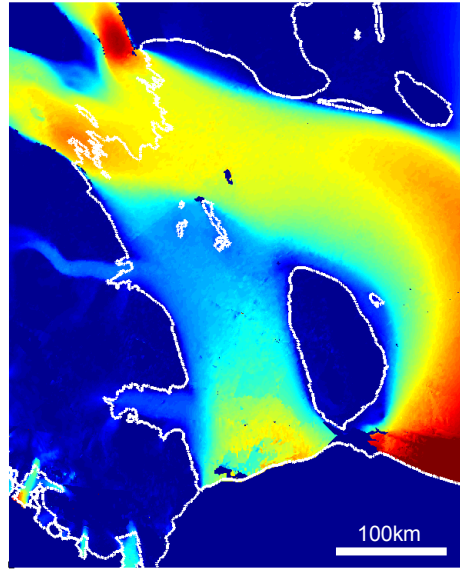


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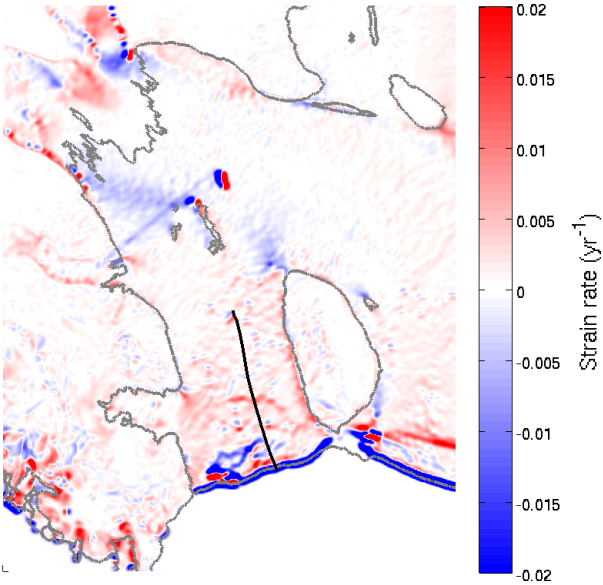
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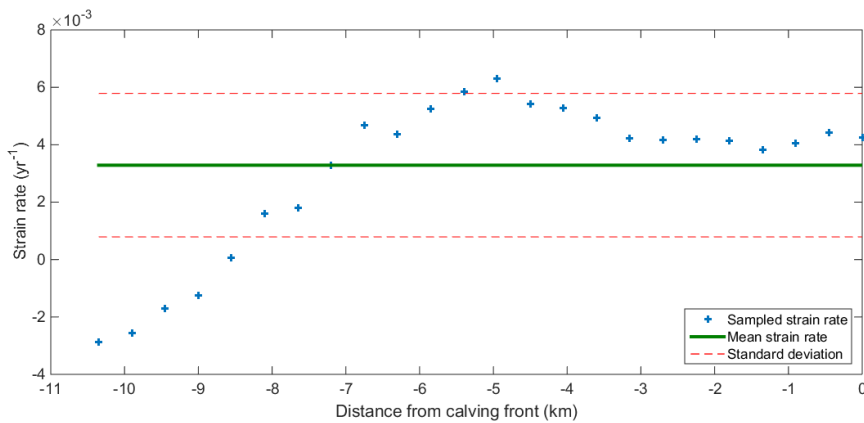
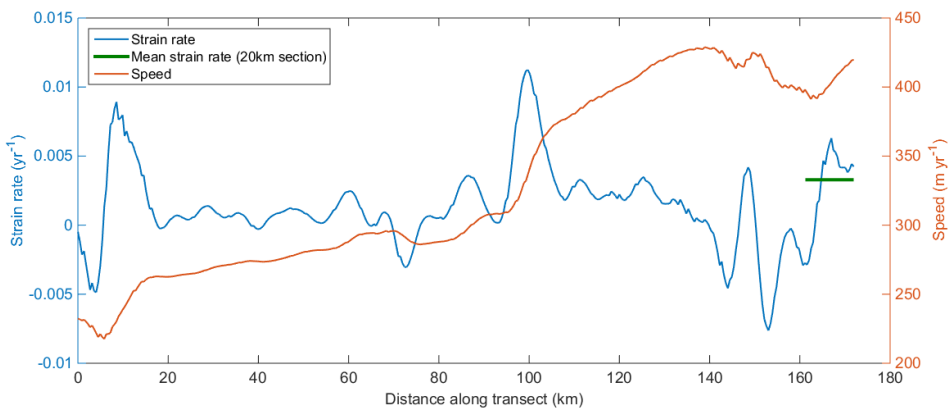
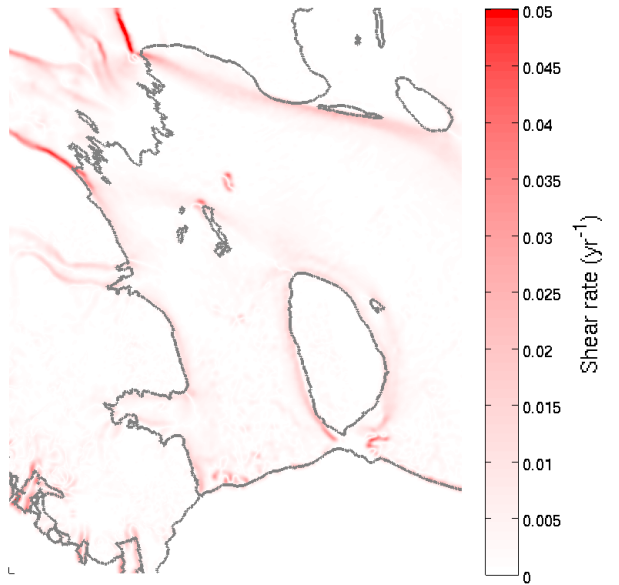
Speed



Strain rate

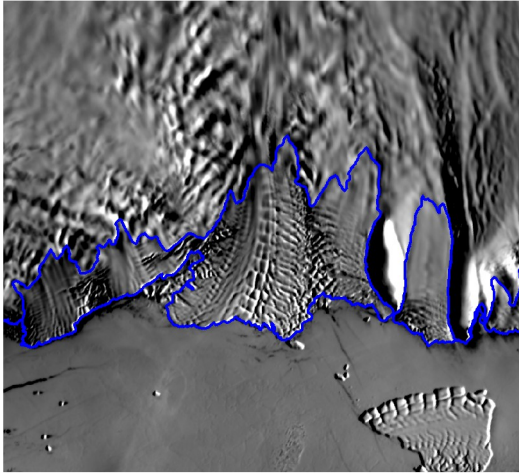


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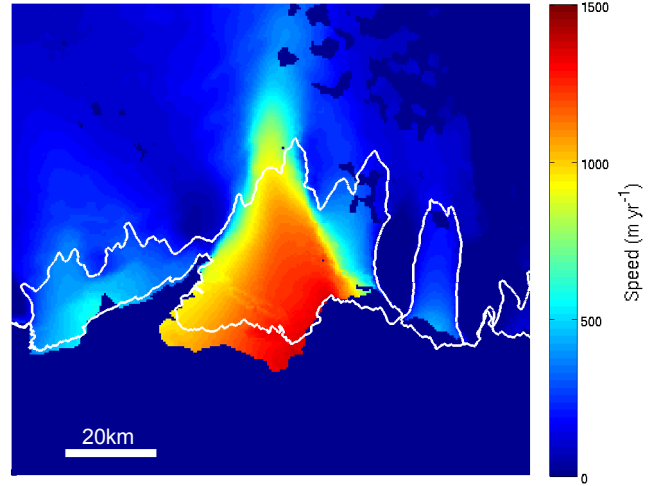


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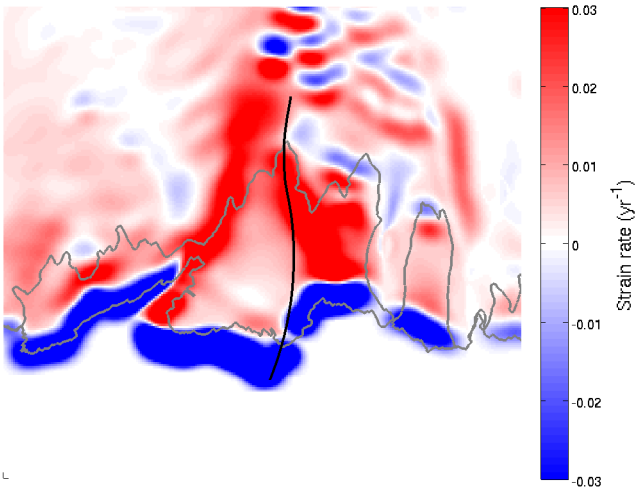
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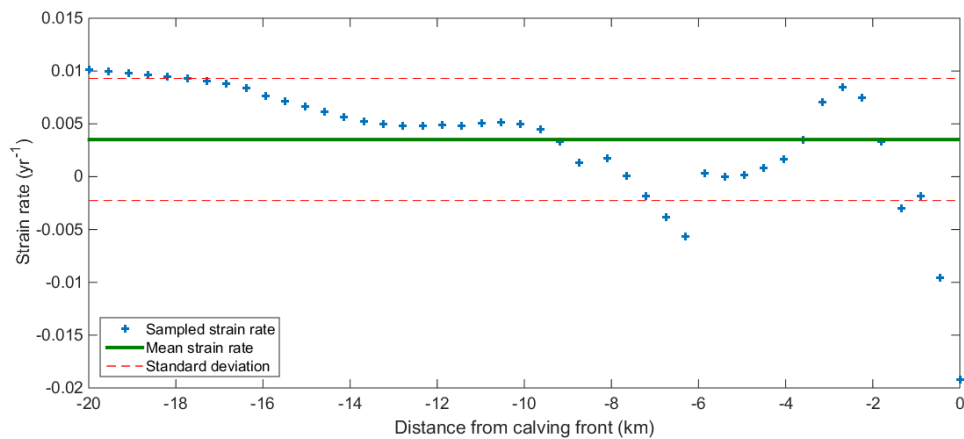
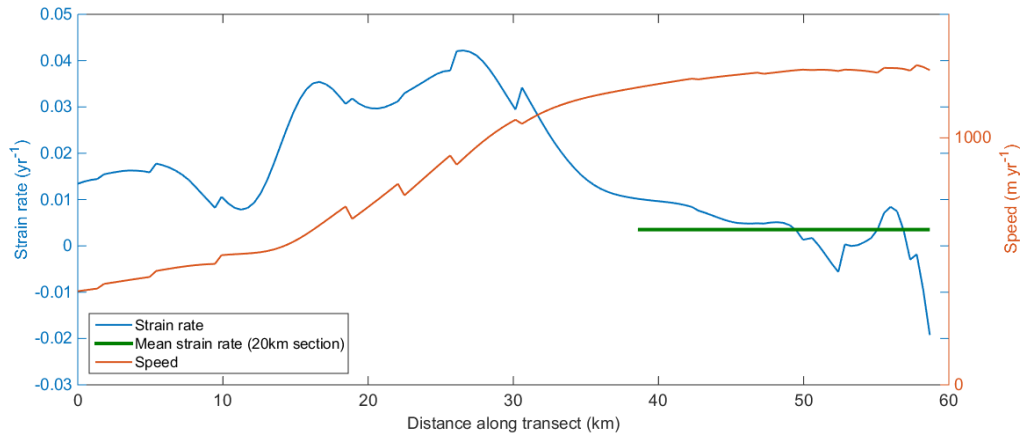
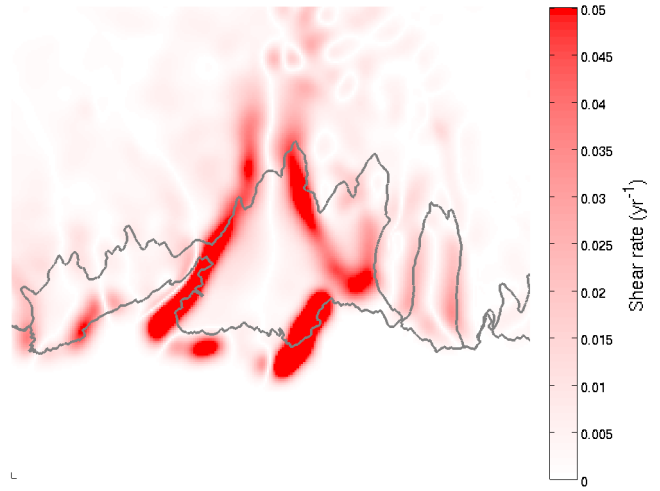
Speed



Strain rate

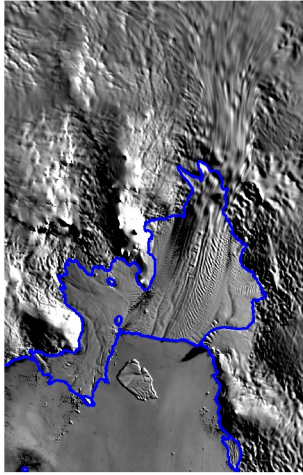


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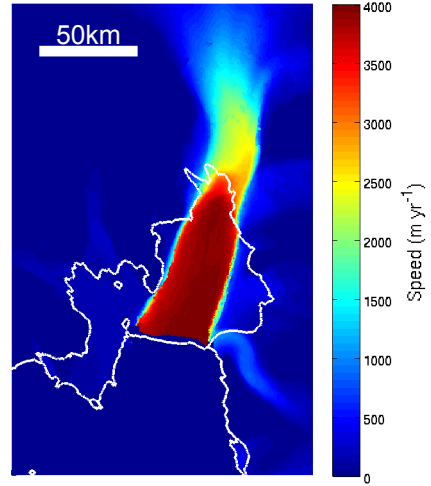


PIG Ice Shelf

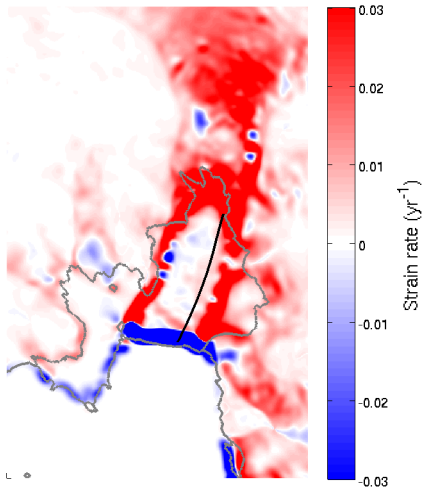
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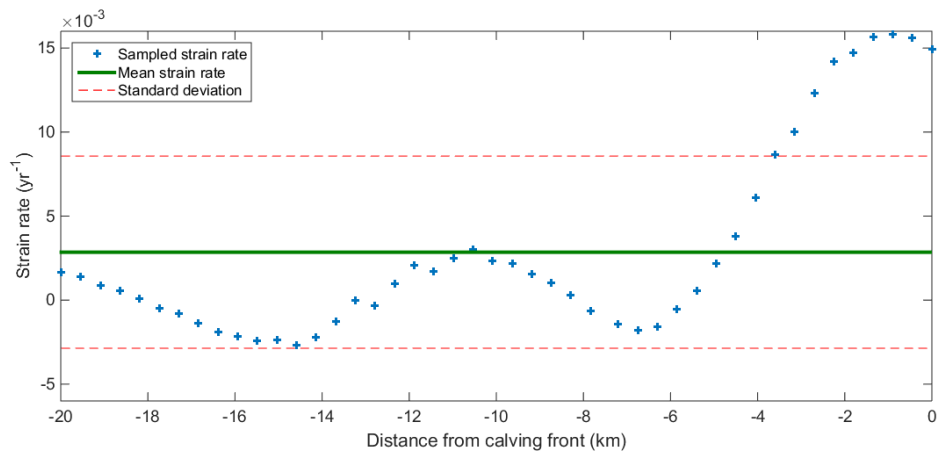
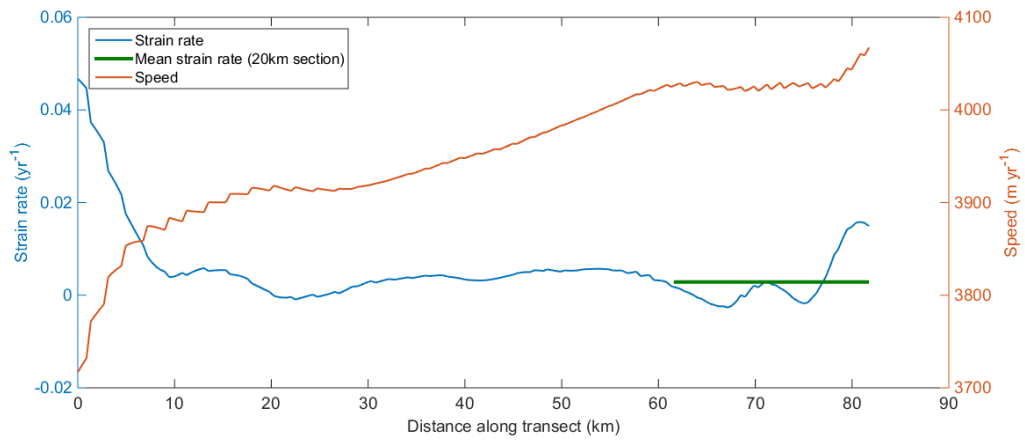
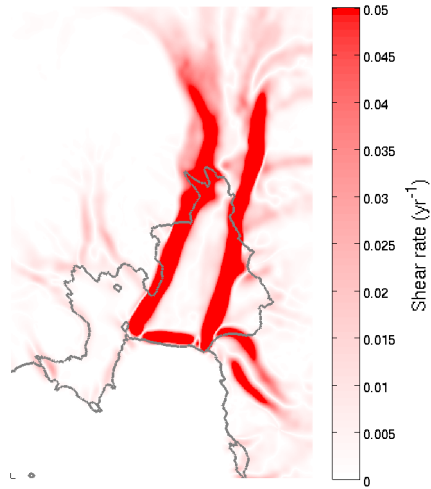
Speed



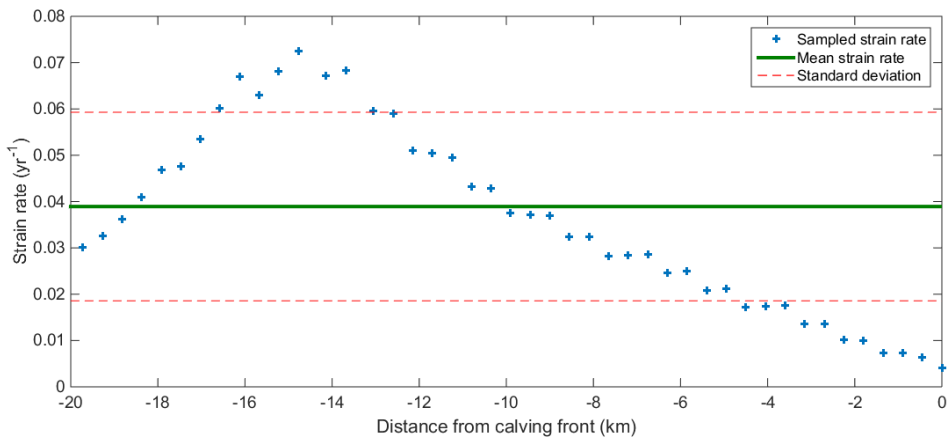
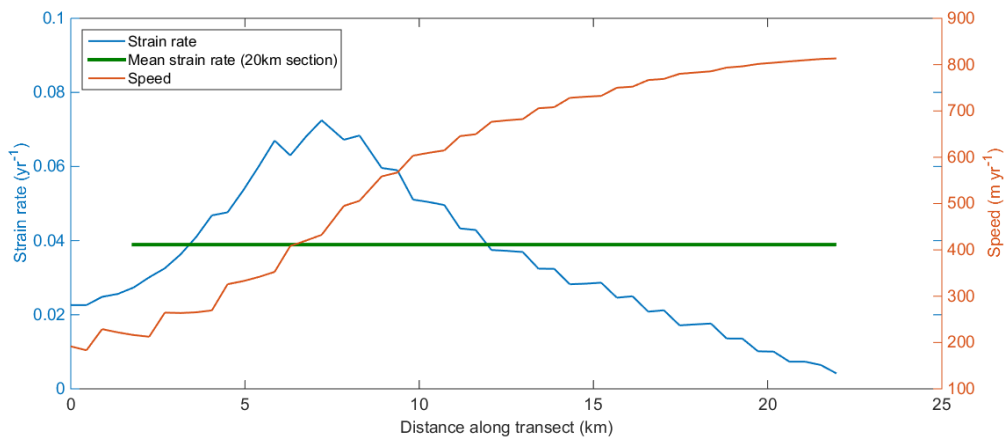
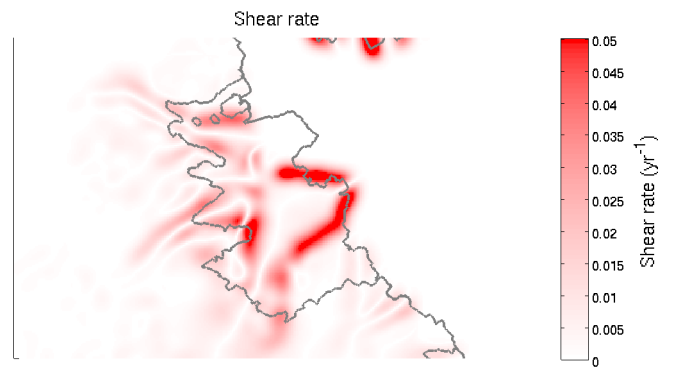
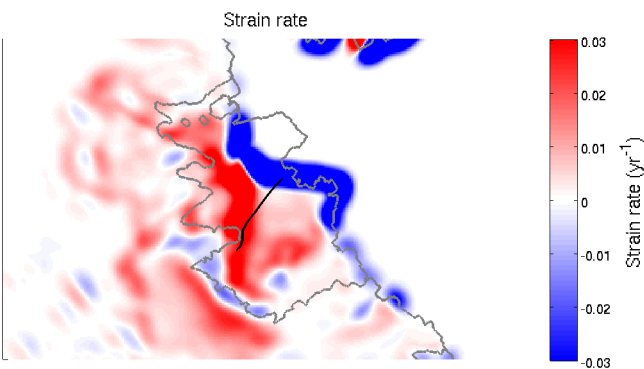
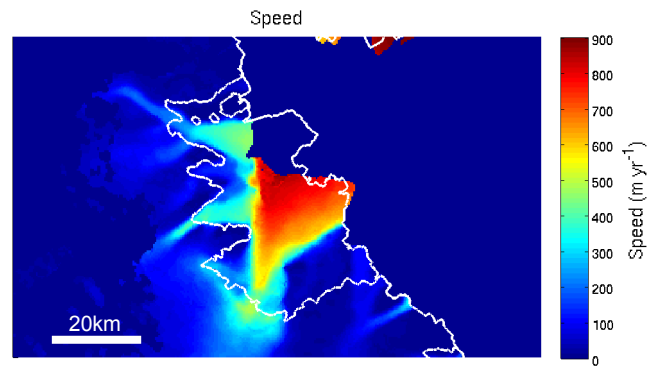
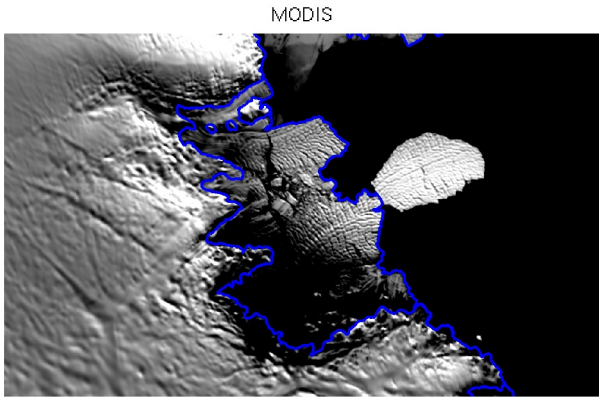
Strain rate



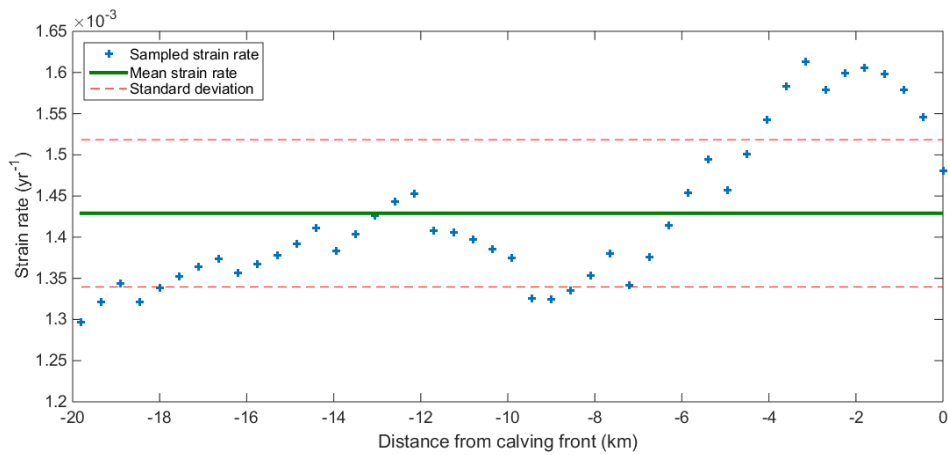
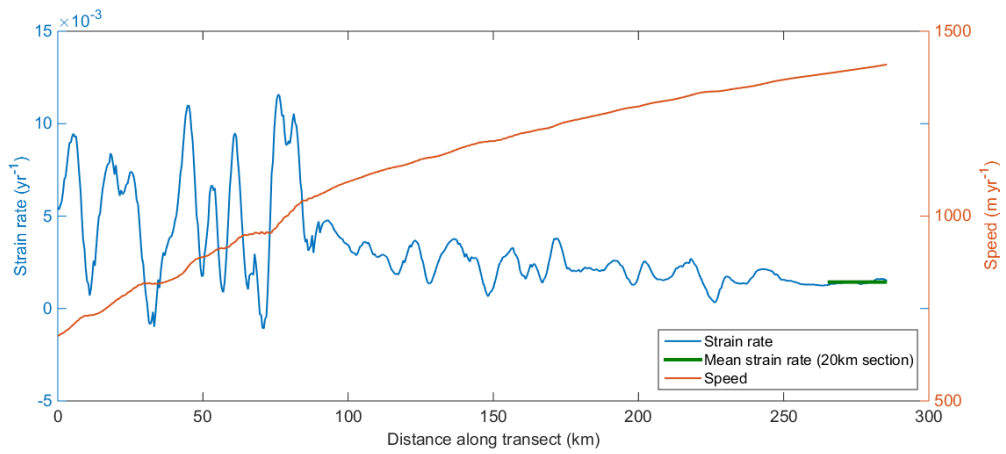
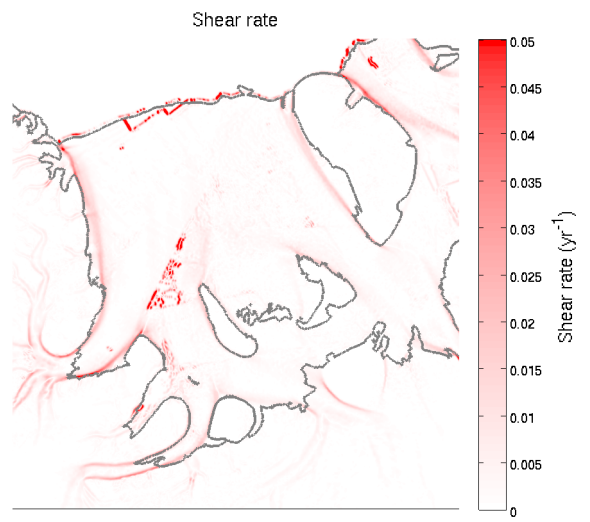
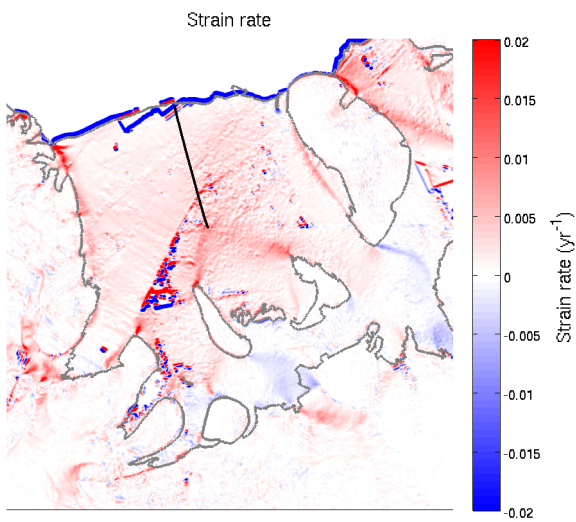
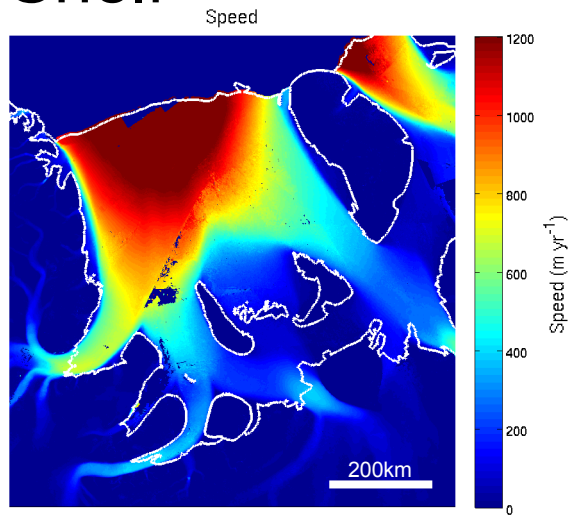
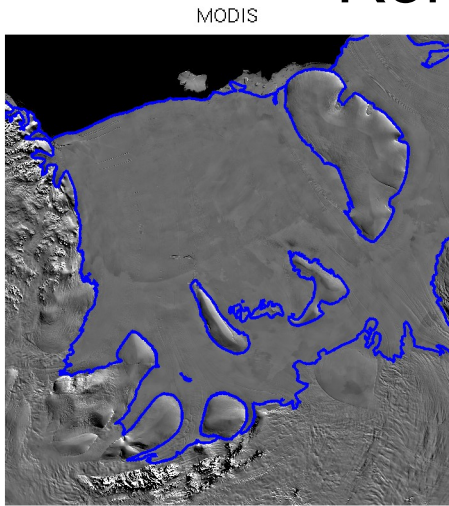
Shear rate



Publications Ice Shelf

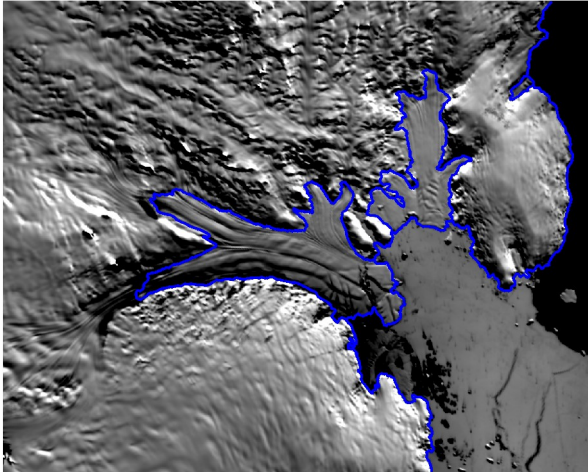


Ronne Ice Shelf

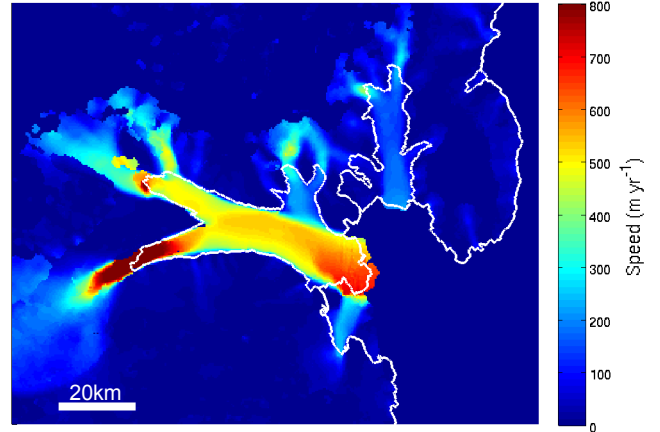


Robert Glacier Ice Shelf

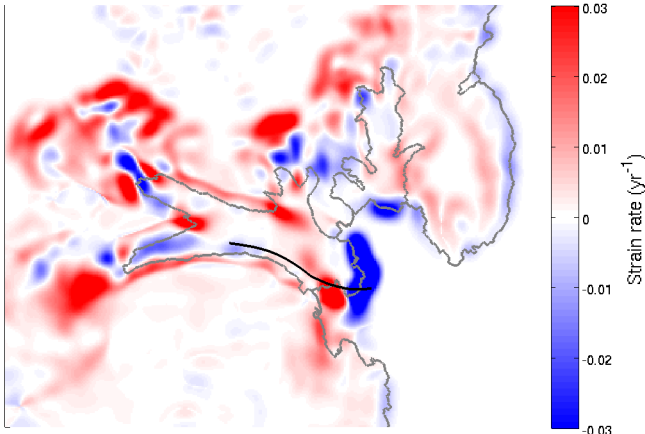
MODIS



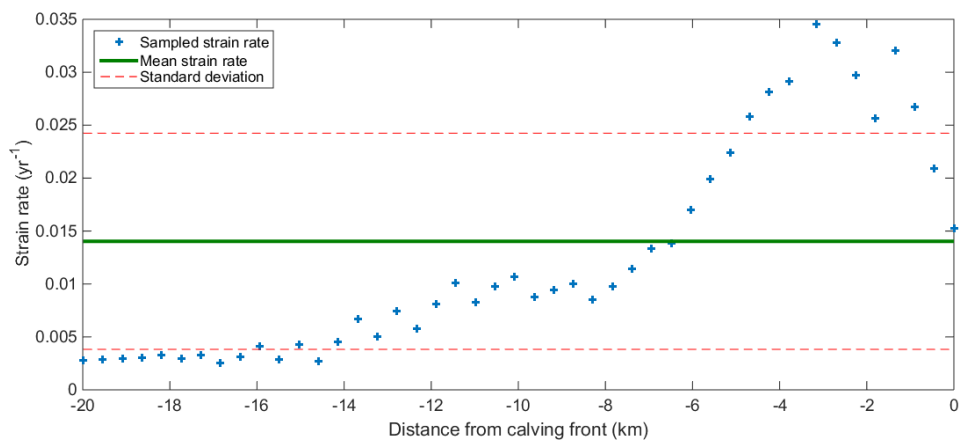
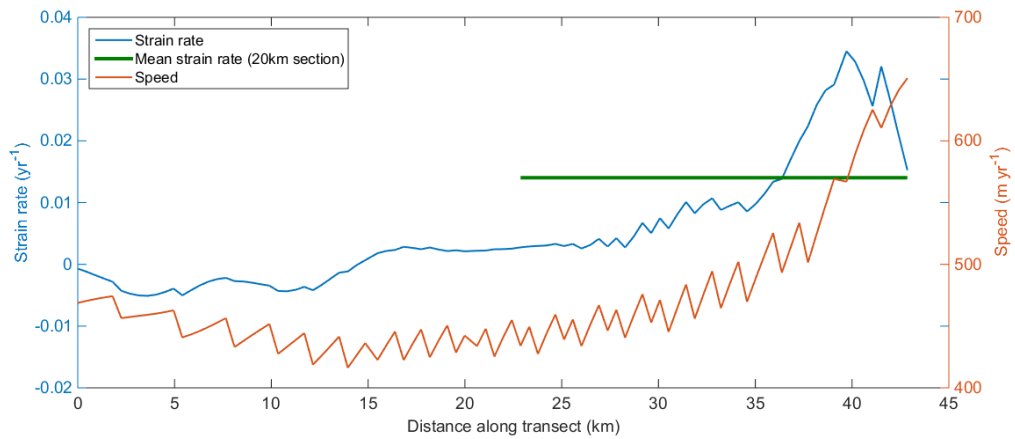
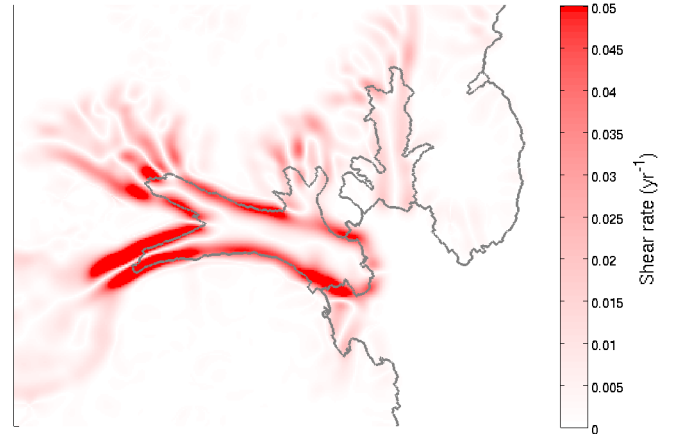
Speed



Strain rate

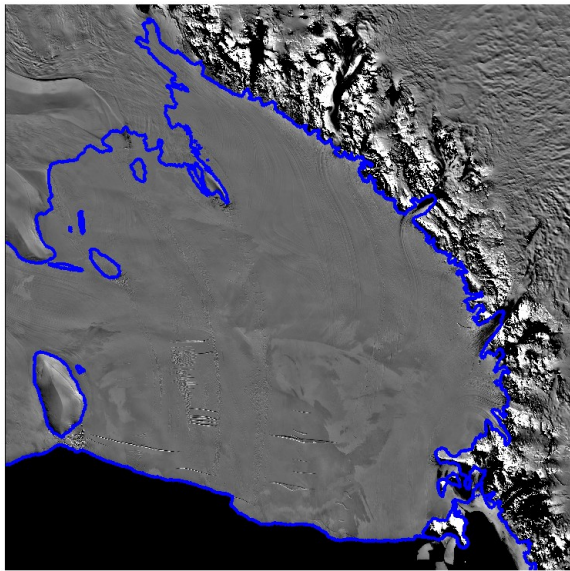


Shear rate

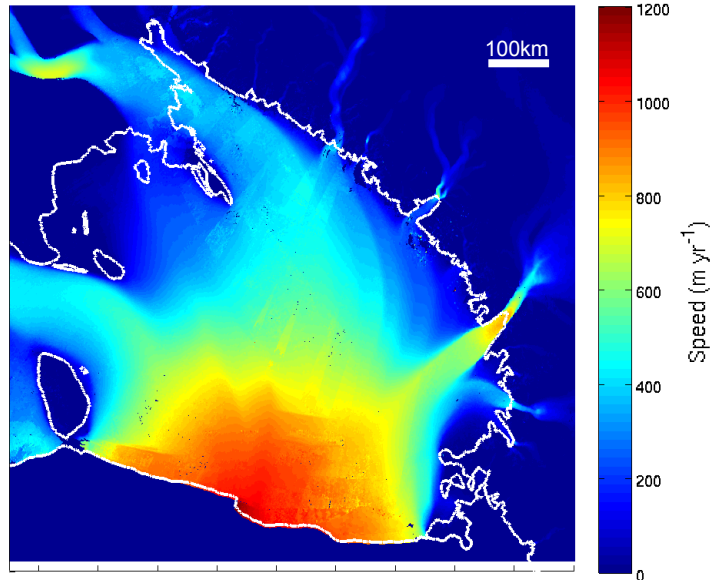


Ross Ice Shelf

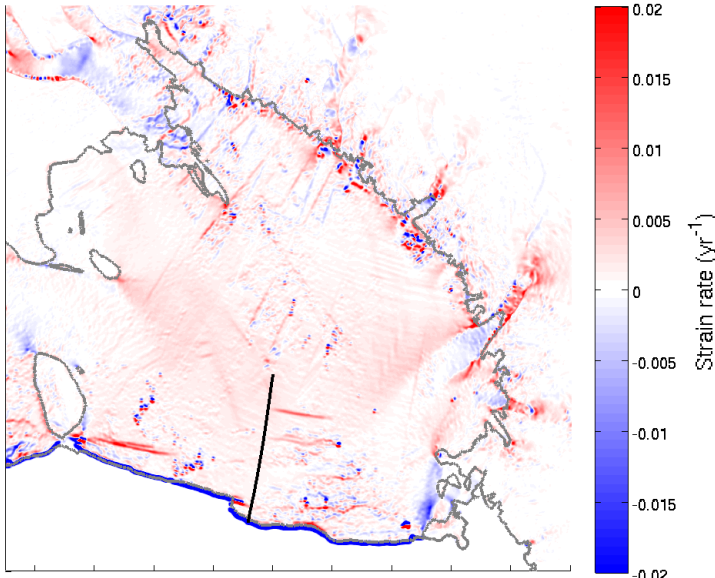
MODIS



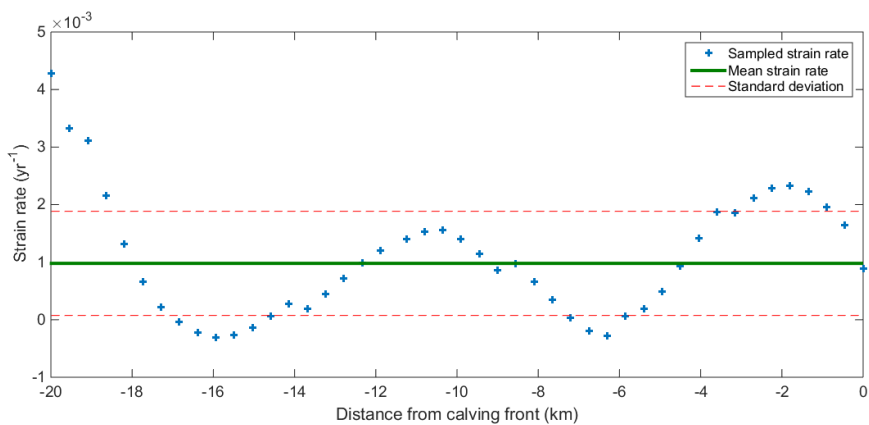
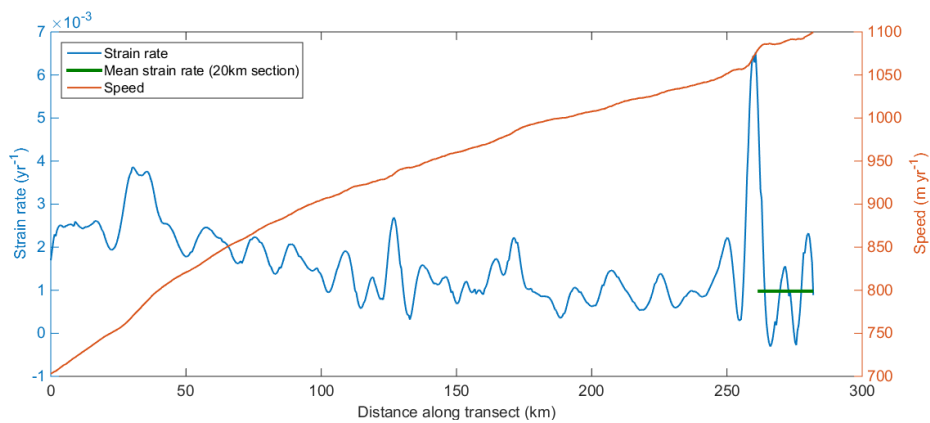
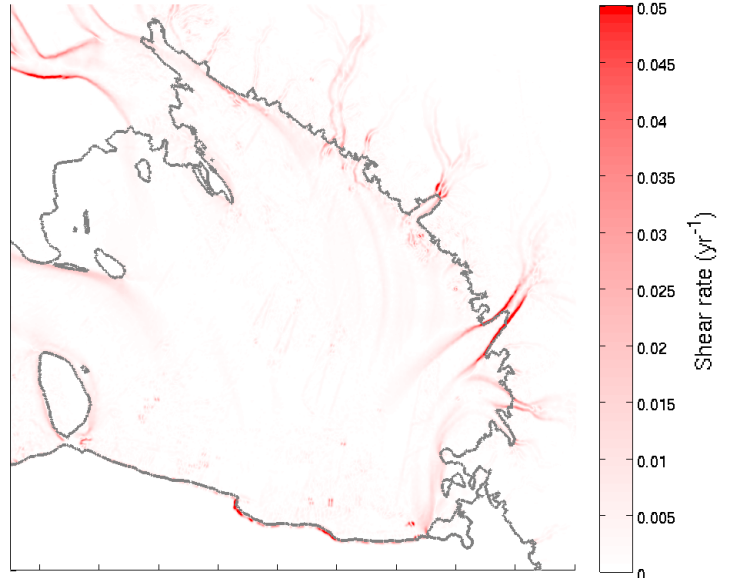
Speed



Strain rate

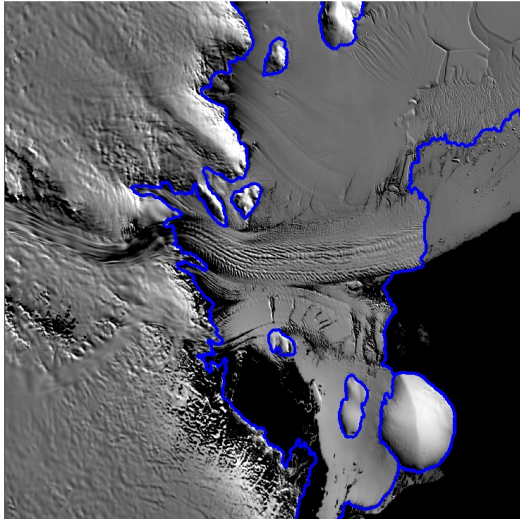


Shear rate

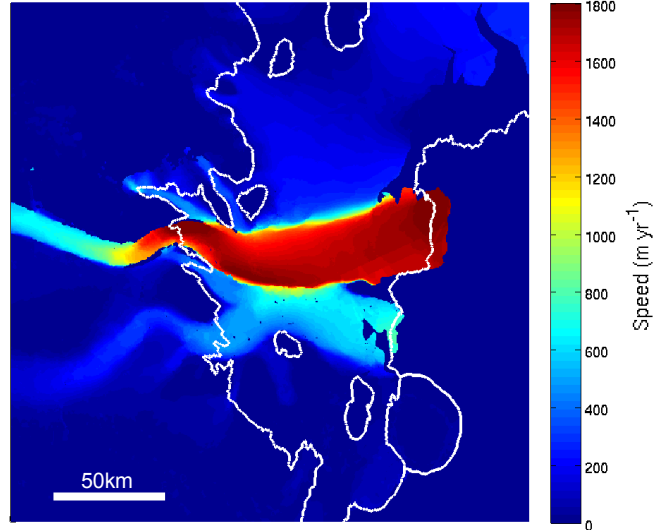


Shackleton Ice Shelf

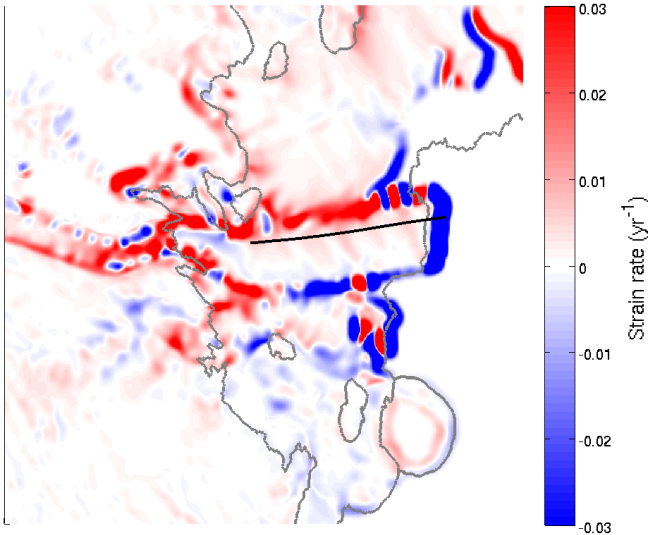
MODIS



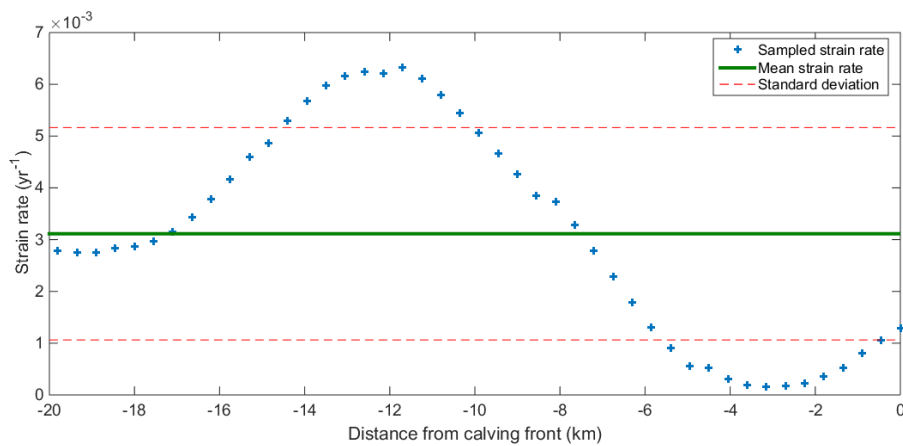
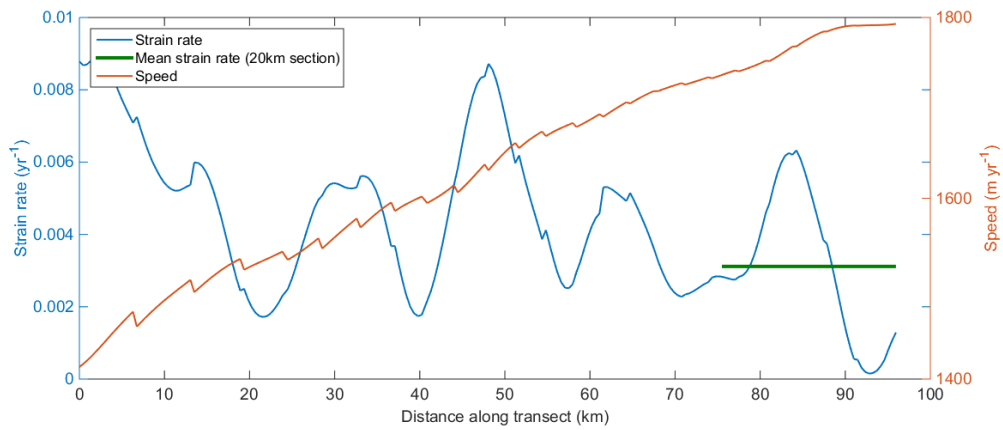
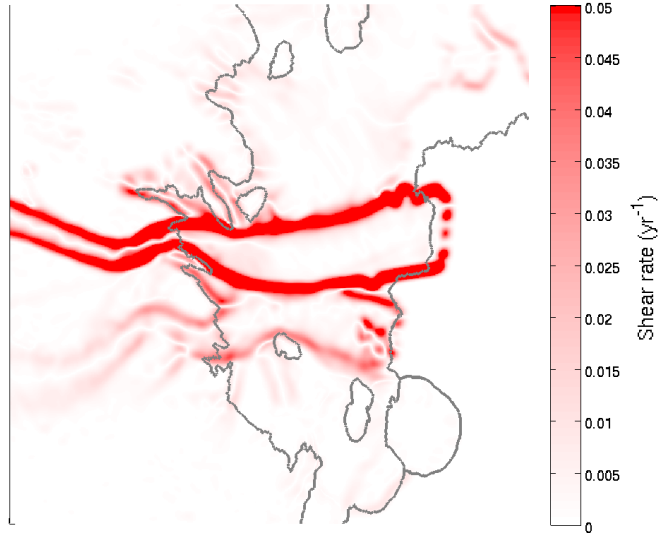
Speed



Strain rate

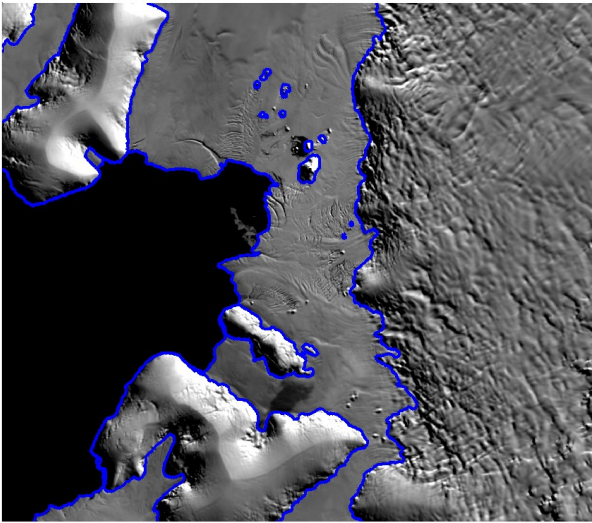


Shear rate

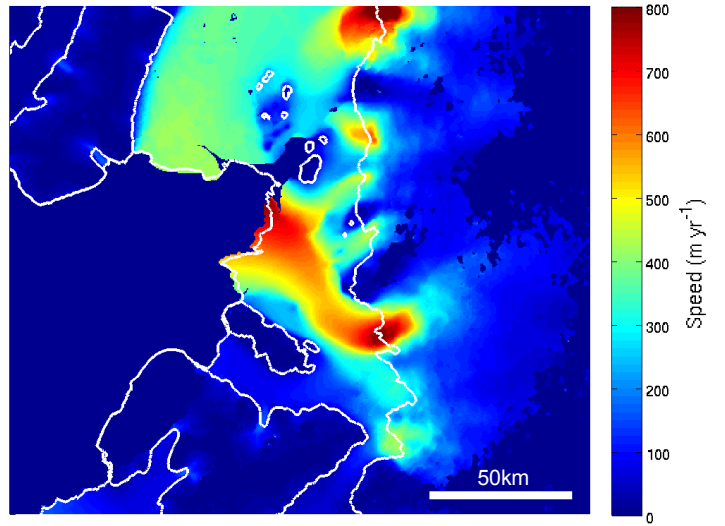


Stange Ice Shelf

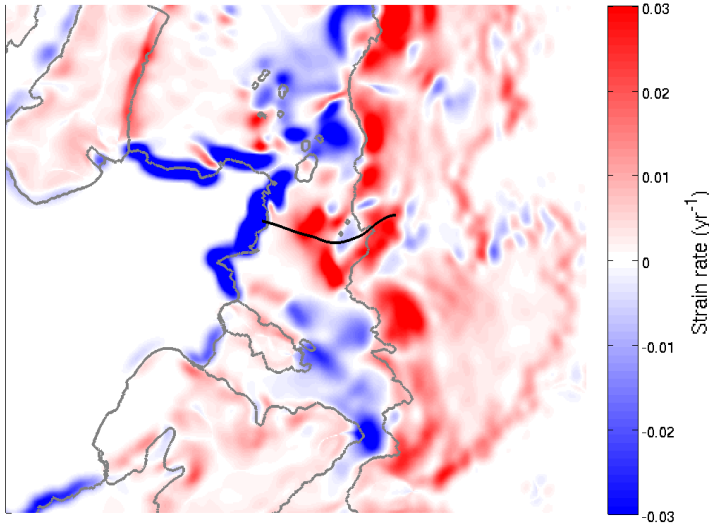
MODIS



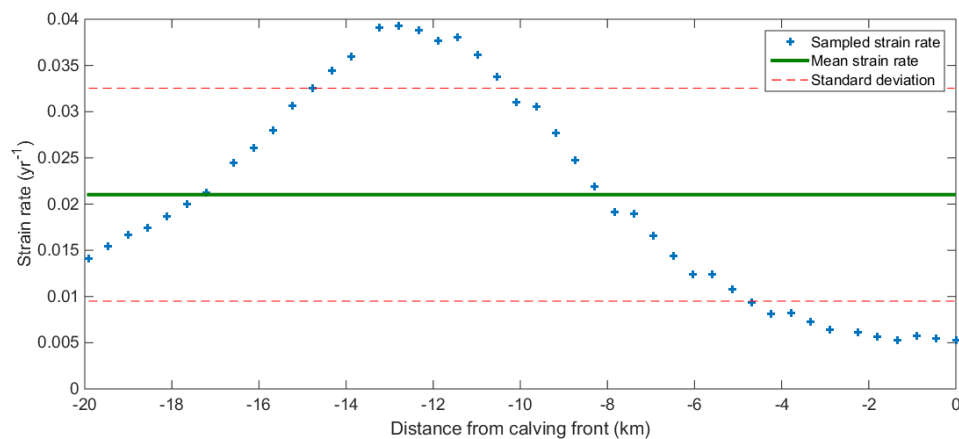
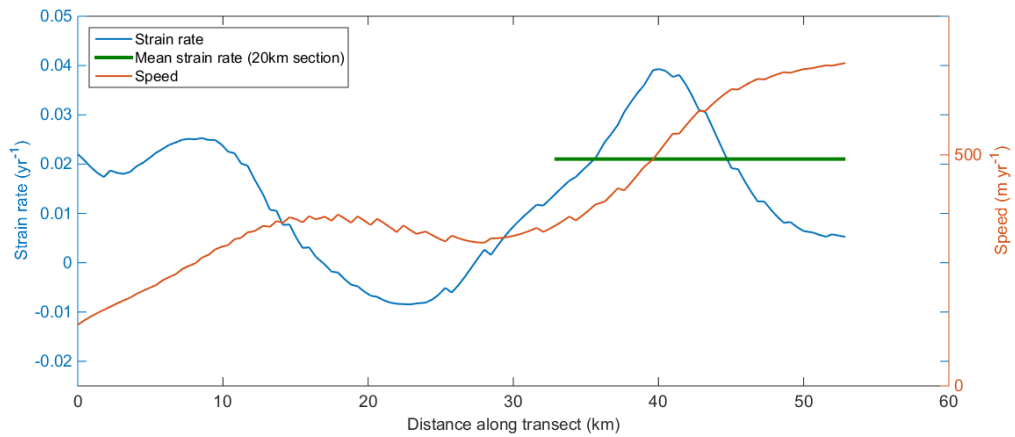
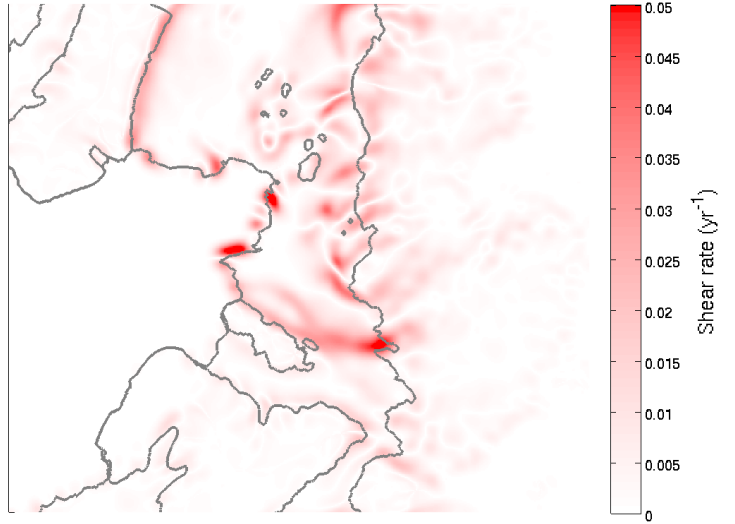
Speed



Strain rate

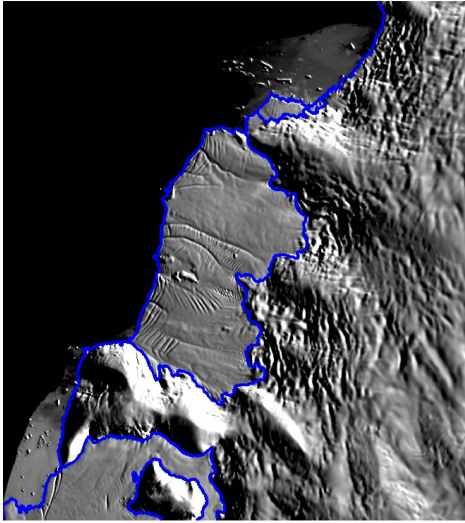


Shear rate

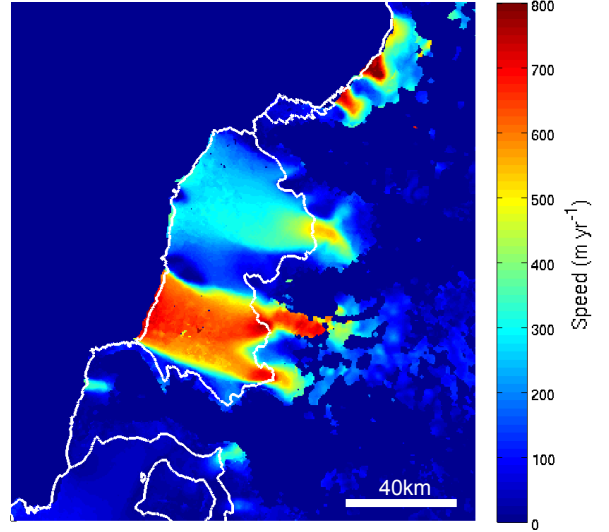


Venable Ice Shelf

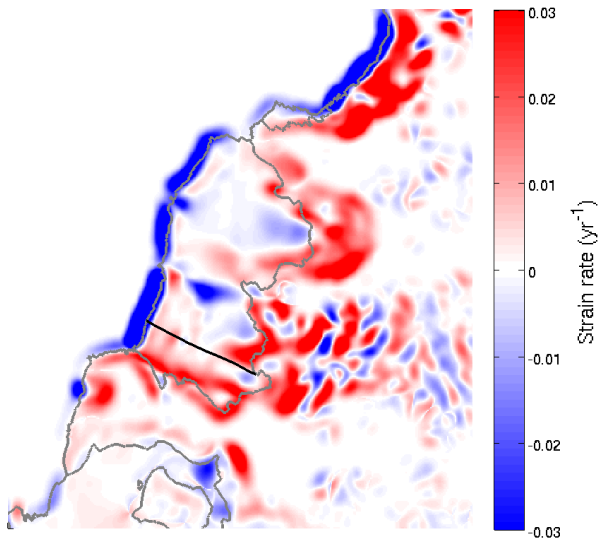
MODIS



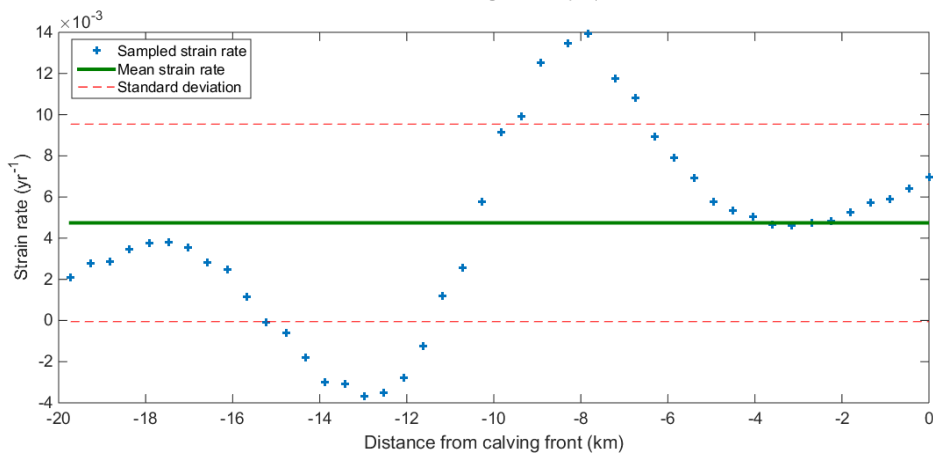
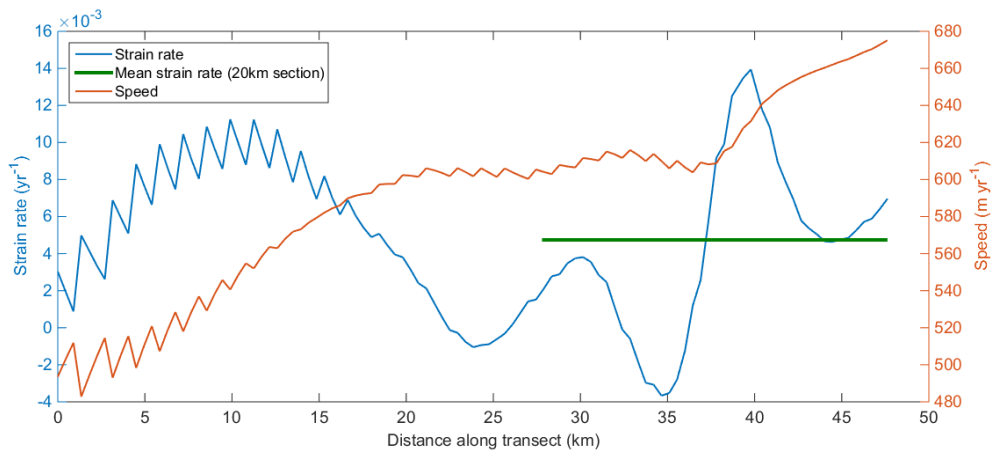
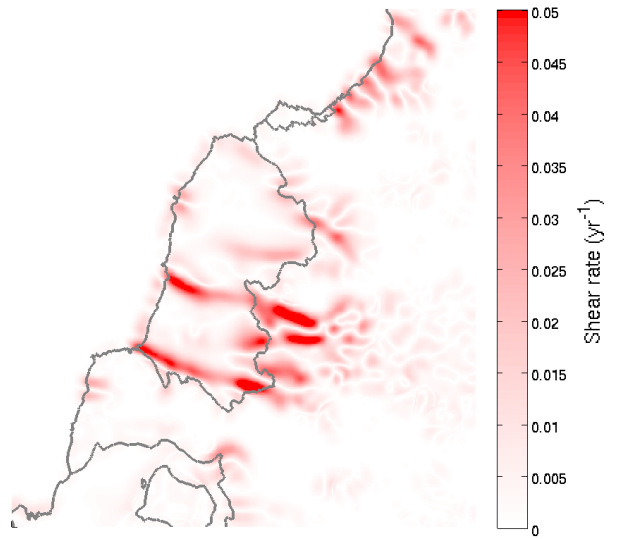
Speed



Strain rate

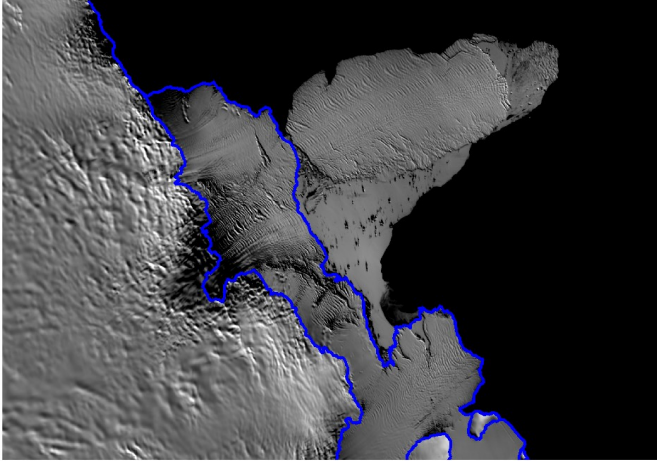


Shear rate

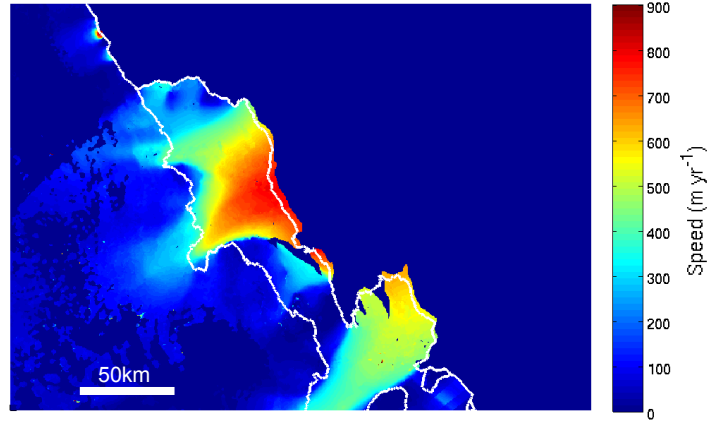


West A Ice Shelf

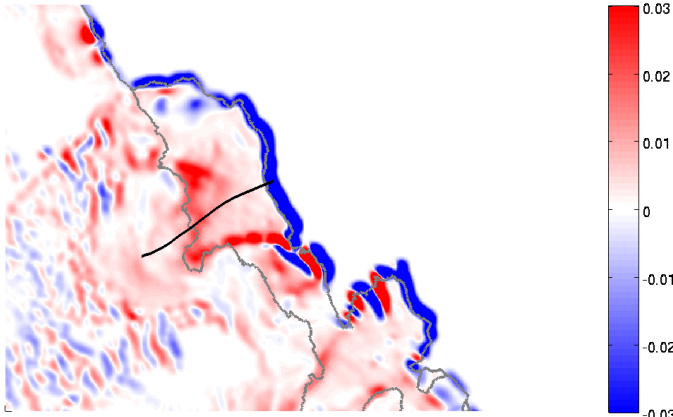
MODIS



Speed



Strain rate



Shear rate

