



Investigating controls of recent acceleration of Pine Island Glacier using inverse modelling

Gwendolyn J. M. C. Leysinger Vieli, Andreas Vieli, and Anne LeBrocq

University of Durham, Geography, Durham, United Kingdom (g.j.m.c.leysinger-vieli@durham.ac.uk)

Pine Island Glacier (PIG) a major marine based outlet stream of the West Antarctic ice sheet (WAIS) currently undergoes rapid dynamic changes such as acceleration, thinning and grounding line retreat. Understanding the cause and controls of these dynamic changes are crucial in improving our ability to predict future contribution of the WAIS to sea level rise.

We will combine a flowline ice-stream model and inverse methods in order to investigate potential factors and processes responsible for the recent and ongoing acceleration of PIG. We will invert for model parameters such as basal slipperiness, ice rheology and thickness in order to fit the modelled flow to observed velocities along the flowline derived from remote sensing. These inversions will be repeated for velocity data sets from several time slices that cover the phase of acceleration of PIG from 1992 to present. A comparison between these inverted parameters from different time periods combined with observed thickness change rates and grounding line retreat will be used to investigate the controlling factors and processes for recent changes of the PIG.