



## **Changing basal conditions during the rapid speed-up of Jakobshavn Isbræ, Greenland**

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Jakobshavn Isbræ has a century-long record of observations, and together with the recent rapid retreat of the ice front and the complete disintegration of its floating ice tongue, it is the perfect natural experiment to learn more about the processes driving its dynamic evolution. Here we use existing surface velocity and ice geometry data from the years 1994, 2000, 2005 and 2008 to infer basal yield stress distributions of Jakobshavn Isbræ.

The Parallel Ice Sheet Model (PISM) is used as a forward model in a Tikhonov inversion. The minimized cost function consists of a data-model misfit term and a model-norm term which is weighted with a regularization parameter. The inverse problem is ill-posed and many solutions for the basal yield stress exist. Parameter choices such as the regularization parameter, the model norm, the ice softness and the initial estimate of basal yield stress influence the solution. We discuss the impact of these choices on the resulting basal yield stress field of Jakobshavn Isbræ to determine appropriate values for the inversions of the different years.

The resulting basal yield stress distributions for each year are then analyzed with particular focus on spatial features in the basal yield stress and the achieved data-model misfit, and on changes along the center line.