



Modelling the behavior of Jakobshavn glacier in the last century

Muresan, Ioana Stefania; Khroulev, Constantine; Khan, Shfaqat Abbas; Kjær, Kurt; Box, Jason E.

Published in:

Proceedings of the Chamonix Symposium

Publication date:

2014

Document Version

Publisher's PDF, also known as Version of record

[Link back to DTU Orbit](#)

Citation (APA):

Muresan, I. S., Khroulev, C., Khan, S. A., Kjær, K., & Box, J. E. (2014). Modelling the behavior of Jakobshavn glacier in the last century. In *Proceedings of the Chamonix Symposium* [70A1071] Chamonix, France: IGS.

General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

70A1071

Modelling the behavior of Jakobshavn glacier in the last century

Ioana S. MURESAN, Constantine KHROULEV, Shfaqat A. KHAN, Kurt H. KJÆR, Jason E. BOX

Corresponding author: Ioana S. Muresan

Corresponding author e-mail: iomur@space.dtu.dk

Current model estimates of the Greenland Ice Sheet (GrIS) are almost entirely based on coarse grids ($>10\text{km}$) and constrained by climate models that span from 60s to present. To improve the projection of future sea level rise, a long-term data record that reveals the mass balance beyond decadal timescale is required. Here, we use a continuous 171 year reconstruction (since the end of the Little Ice Age) by J.E. Box of the Greenland Ice Sheet climatic surface mass balance and its sub-components to study the interaction between climate and the cryosphere originating in changes in the surface mass balance and dynamics of the GrIS over the last 111 years.

Throughout our study, we use the Parallel Ice Sheet Model (PISM) capabilities. The initialization of the ice sheet is performed on a 5 km grid using paleo climatic forcing (125 ka to present) based on a positive degree day (PDD) model. For a better overview and for the purpose of increasing the resolution to 2 km, our study focuses only on the Jakobshavn glacier. In order to determine the locations of the flow for the regional model, a drainage basin mask was extracted from the surface elevation data based on the gradient flow. While inside the basin mask the full PISM model is applied, outside the basin mask the boundary conditions are taken as captured by the whole Greenland initialization. Considering the surface mass balanced reconstruction where the monthly accumulation rates are assumed to be $1/12$ of the annual accumulation, a yearly 1900–2011 climatic forcing is applied in the regional run.