



Long term mass balance of the Helheim and Kangerdlugssuaq glaciers in

Khan, Shfaqat Abbas; Fitzner, Antje; Kjær, Kurt; Korsgaard, Niels; Aschwander, Andy; Bjørn, Anders; Bevan, Suzanne; Kjeldsen, Kristian ; Bueler, Edward; Luckman, Adrian

Published in:
Geophysical Research Abstracts

Publication date:
2013

Document Version
Publisher's PDF, also known as Version of record

[Link back to DTU Orbit](#)

Citation (APA):
Khan, S. A., Fitzner, A., Kjær, K., Korsgaard, N., Aschwander, A., Bjørn, A., ... van den Broeke, M. (2013). Long term mass balance of the Helheim and Kangerdlugssuaq glaciers in. *Geophysical Research Abstracts*, EGU2013-8581-1.

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.



Long term mass balance of the Helheim and Kangerdlugssuaq glaciers in southeast Greenland

Shfaqat Abbas Khan (1), Antje Fitzner (2), Kurt Kjær (3), Niels Korsgaard (3), Andy Aschwanden (4), Anders Bjørk (3), Suzanne Bevan (5), Kristian Kjeldsen (3), Edward Bueller (4), Adrian Luckman (5), and Michiel van den Broeke (6)

(1) DTU - Space, National Space Institute, Geodesy, Kgs. Lyngby, Denmark (abbas@space.dtu.dk), (2) Niels Bohr Institute, University of Copenhagen, Copenhagen, Denmark., (3) Centre for GeoGenetics, Natural History Museum, University of Copenhagen, Copenhagen, Denmark., (4) Geophysical Institute, Fairbanks, Alaska, USA, (5) Geography Department, College of Science, Swansea University, Swansea, UK., (6) Institute for Marine and Atmospheric Research, Utrecht University, Utrecht, The Netherlands

Observations over the past decade show huge ice loss associated with speeding up of glaciers in southeast Greenland in 2003, followed by a deceleration in 2006. These short-term episodic dynamic perturbations have a major impact on the mass balance at decadal scale. However, to improve the projection of future sea level rise, a long-term data record that reveals the mass balance between episodic events is required. Here, we extend the observational record of marginal thinning of Helheim glacier (HG) and Kangerdlugssuaq glacier (KG) from 7 to 30 years. Our measurements reveal that, although the frontal portion of HG thinned by more than 100 m during 2003–2006, it thickened by more than 50 m during 1981–1997. During the same periods, KG was stable until 1998 and experienced major thinning only after 2003. Analyses of their sensitivity to sea surface temperature (SST) anomalies and variations in air temperature suggest that both outlet glaciers respond immediately to small fluctuations in both the SST and air temperature. Furthermore, we compare our observations of ice flow speed and elevation changes with predictions based on the The Parallel Ice Sheet Model (PISM) software.