B10-O15

MODELLING MASS BALANCE AND DYNAMICS OF HARDANGERJØKULEN ICE CAP, SOUTHERN NORWAY

Henning Akesson *(University of Bergen and Bjerknes Centre for Climate Research, Norway)*
Kerim H Nisancioglu *(University of Bergen and Bjerknes Centre for Climate Research, Norway)*
Rianne H Giesen *(Institute for Marine and Atmospheric Research Utrecht, Netherlands)*
Mathieu Morlighem *(University of California Irvine, United States)*

henning.akesson@geo.uib.no

Arctic glaciers and small ice caps respond considerably faster to climate change than the Greenland ice sheet. Evidently, half of the current sea-level contribution from the cryosphere comes from glaciers and small ice caps, and this contribution is predicted to be similar by year 2100. Further, these small ice masses are in many places vital for energy production from hydropower. Future operations of this renewable energy source depend heavily on the available freshwater storage and runoff from glaciers and ice caps.

We use a numerical ice flow model for glacier dynamics, combined with a surface energy balance model for mass balance and a hydrological model to investigate how Hardangerjøkulen ice cap (73 km^2, 60.55°N, 7.43°E) in southern Norway will respond to climate over the next century. We calibrate the different model components during the period from the Little Ice Age maximum in 1750 until present-day using a suite of geomorphological, glaciological, meteorological and hydrological data. Regional climate simulations are then used to predict the interplay between meteorological conditions, mass balance changes and ice dynamics for the next century. We discuss the implications of our results for hydropower operations and compare with similar glacier settings in the Arctic.