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# Climatology of the 79N glacier region, northeast Greenland

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Nioghalfjerdsforden (also known as 79N glacier after its location) is a tidal-outlet glacier with an 80km long floating tongue, in the northeast of Greenland. In recent years, the floating ice tongue has increased in velocity and a number of calving events have displayed the potential sensitivity of the glacier to changing conditions. Approximately 8% of the Greenland ice sheet drains into 79N, prompting belief that any instabilities may propagate upstream, and into the interior of the ice sheet. Despite this, relatively little is known about the past or current meteorological conditions near the surface of 79N. Without adequate knowledge of the climatology, the response of the glacier to future changes cannot be accurately assessed.

Here we present the climatological near-surface conditions of the 79N glacier, analysed from both ERA-Interim and MERRA2 reanalysis products. Observations from two weather stations (79.54,-21.11 and 79.54,-20) located on the floating tongue of the glacier erected from 1996-1999 have been compared with both reanalysis products. Both ERA-Interim and MERRA2 accurately represent the near-surface conditions, with low mean biases in numerous variables. There is an increasing temperature trend over the last 37 years, and an increase in the number of days with an air temperature greater than 0°C. Katabatic drainage from the ice sheet dominates the wind direction signal and leads to frequent peaks in temperature due to vertical mixing. The Weather Research and Forecasting (WRF) model is used to model the near-surface conditions during the observational period, and provides additional information on the spatial structure of the katabatic winds.

The modelling results from this study will be used to select the optimal options for running WRF over the 79N glacier, and will contribute to the GROCE project (GReenland ice sheet/OCEan interaction). More specifically, we will model the atmospheric impacts on the surface energy balance of the 79N glacier.