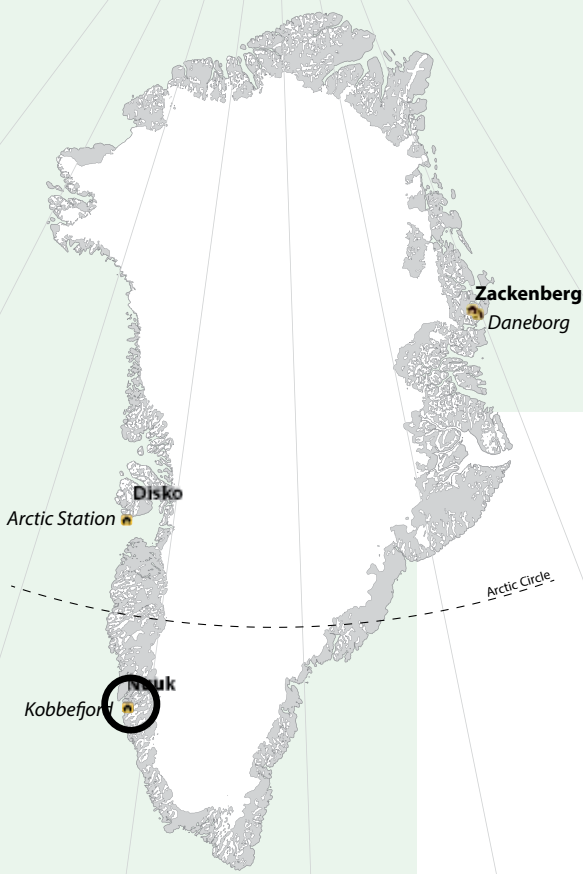


THE POTENTIAL OF TO IMPROVE THE DESCRIPTION



Arctic fjords, linking land and ocean, are amidst some of the most climate-sensitive regions on the planet. Although they are highly vulnerable to climate warming, there is currently a gap in meteorological data needed to capture climate gradients in these complex areas in Greenland.

Mobile meteorological measurements in Greenland are essential to study complex gradients in fjord systems and enhance process understanding for upscaling and modelling purposes. In order to study larger spatial gradients, increasing the spatial resolution required to explain complex fjord system climate variability, mobile measurements are valuable.

In 2016, Greenland Ecosystem Monitoring (GEM) programme installed an automatic weather station on a commuter ferry (Marie Martek) to collect meteorological data. The ferry, which travels weekly between Nuuk and Kapisillit samples the fjord system (Fig. 1, left). These data are useful for testing small-scale performance of climate models in complex fjord systems and complement several land-based meteorological stations. Additionally, meteorological stations (operated by Asiaq – Greenland Survey) are used for comparison purposes.

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Source:

GEM ClimateBasis, Nuuk

Data can be accessed on:
www.data.g-e-m.dk



Figure 1. Left panel: the weather station mounted on the vessel Marie Martek. Right panel: Data display in the passenger cabin. Photos: Jakob Abermann.

MOBILE WEATHER STATIONS OF COMPLEX FJORD CLIMATOLOGY

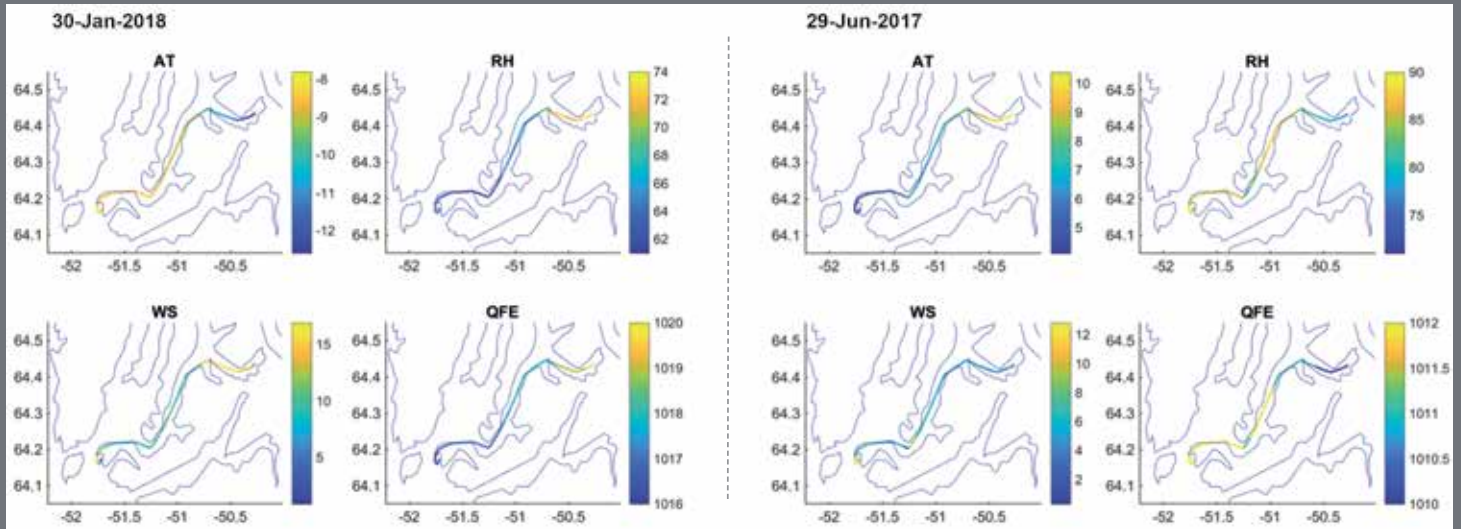


Figure 2. Two examples of the recorded transects for air temperature (AT), relative humidity (RH), wind speed (WS) and pressure (QFE) for a classical winter example (left, 30 January 2018) and a summer example (29 June 2017).

The ferry based automatic weather station provides data on air temperature, air pressure and wind speed. Additionally, the data is visualised in the common areas of the ship, allowing for increased visibility of the GEM programme among local communities (Fig. 1, right).

Preliminary results show interesting patterns of climate variability in the fjord system (Fig. 2). In the winter, it is about 5 °C colder in Kapisillit than in Nuuk, with higher humidity, higher wind speeds and a higher pressure, while in the summer air temperature is higher in Kapisillit, relative humidity lower, wind speed more variable and pressure lower. Summarizing all transects, we can see a clear seasonal dependence following continentality gradients with colder temperatures in winter and higher in summer in the inland parts of the fjord (Fig. 3).

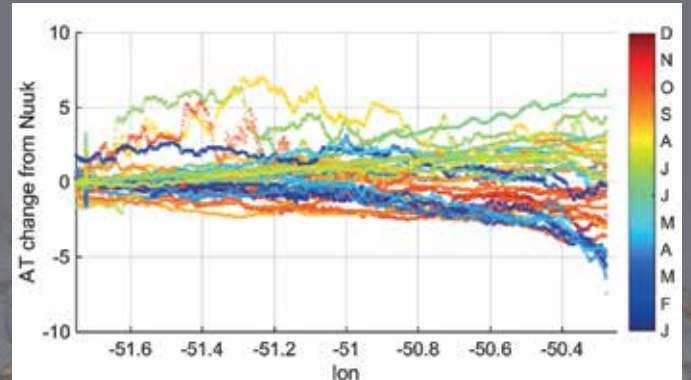


Figure 3. All recorded air temperature transects as a function of longitude relative to Nuuk. The color code shows the time of the year (red and blue: winter months, green and yellow: summer months).

