

Glacier Monitoring on Southern Ellesmere Island

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Our research on Southern Ellesmere Island is focused on monitoring glacier change and learning about how local glaciers interact with the atmosphere, ocean, and local rivers and lakes. Some of our work is carried out using images taken remotely, such as from helicopters to measure the change in thickness of the ice and to monitor changes on the glacier surface, including meltwater. We also use satellite imagery to measure larger-scale glacier change and estimate the speed of ice flow over time. GPS units placed on tripods on glaciers provide more details on ice-flow speed, timelapse cameras provide information about ice-marginal lakes and the ice front, weather stations record climate conditions, and we use stakes drilled into the ice to measure surface melt. A ground-penetrating radar will send signals through the ice to understand the ice structure and the shape of the bed beneath. We also use uninhabited aerial vehicles (UAVs) to fly over the ice to take detailed measurements of the ice surface and estimate its temperature and the amount of meltwater present. These UAVs are also used to fly over fjords to measure iceberg shapes and sizes and to estimate the temperature of the ocean surface. We also lower instruments into the fjord waters to measure ocean properties such as temperature, salinity, and water flow speed, from boats or from autonomous surface vehicles (ASVs).

Our research is focused on the glaciers around Grise Fiord, including Sydkap Glacier to the west and Manson Icefield to the east. We will access our sites by helicopter and boat from Grise Fiord, and plan to camp close to some of the glaciers. We will hire community members as field team members and polar bear guards whenever possible. We will report our results to local communities, and share our data by providing them to freely-available public repositories and through publication in peer-reviewed scientific literature.