Northern Ellesmere Ice Shelves, Ecosystems and Climate Impacts

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In July 2015, we carried out oceanographic, hydrological and glaciological measurements on the Milne Ice Shelf and Milne Glacier, northern Ellesmere Island. The field team included Dr. Luke Copland, PhD student Andrew Hamilton, MSc student Abigail Dalton, MSc student Jill Rajewicz, undergraduate student Adam Garbo and research assistant Kevin Xu (teacher at Qarmartalik School, Resolute Bay).

In the field we recovered instruments that recorded temperature and salinity in Milne Fiord over winter and re-deployed these to continue monitoring changes in the fiord for another year. We serviced and downloaded a weather station established in 2009, which provides the only source of near real-time weather information for northern Ellesmere Island (http://tinyurl.com/milnewx). A total of 7 timelapse cameras were downloaded and serviced. These cameras allow us to monitor changes that occur while we're not there.

We spent a week camping on the Milne Ice Shelf near a large crack in the ice that has been there for decades. There, we conducted ice penetrating radar surveys to understand the shape and structure of the crack, and we lowered a current meter and temperature and salinity dataloggers through a natural hole into the ocean below. We found a zone of fast flowing water at 4-6 m depth beneath the ice shelf and also noted the presence of a rock ridge below the ice shelf which was previously unknown.

On the Milne Glacier we remeasured and reinstalled a series of stakes drilled into the ice, allowing us to track surface melt over the year. We explored the grounding line of the glacier, profiled the temperature and salinity of the ocean through cracks in the ice and measured turbidity at different depths. These data will help us understand the impact of meltwater input on the fiord.

In addition, fieldwork in May and July 2015 at White Glacier, Axel Heiberg Island, continued the long-term mass balance measurements there. Three weather stations on the glacier and 3 off the glacier were serviced, and total of 8 timelapse cameras were downloaded. On nearby Good Friday Glacier we installed 3 new GPS systems to measure the motion of the ice automatically over the winter, to see if it is changing over time.

Profiling of ocean salinity and temperature through a crack on the Milne Ice Shelf.