

Northern Ellesmere Ice Shelves, Ecosystems and Climate Impacts
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Fieldwork in 2012 was based out of Purple Valley, at the rear of the Milne Ice Shelf. Two trips were made, in May and June/July. The May trip comprised co-PIs Dr. Luke Copland and Dr. Derek Mueller, MSc student Adrienne White and MSc student Miriam Richer McCallum. Dr. Derek Mueller and PhD student Andrew Hamilton returned for the July trip. During these field trips we made the following measurements:

- Ground-penetrating radar surveys were made at the rear of the Petersen Ice Shelf and compared to the results of ice coring to depths up to 14 m. The aim of this work was to understand the causes of intermittent radar returns found in this region in previous years. The results indicated that the penetration of saline water into the base of the ice shelf is the likely cause of these patchy returns.
- Shallow ice cores were drilled in lake ice and ice shelf areas to provide validation of satellite imagery, and to provide information on how the ice cover in this area has changed recently.
- A total of 4 new time-lapse cameras were installed to monitor the snow melt and accumulation patterns across the study site, and to monitor ice shelf breakups when we weren't there.
- We recovered instruments that recorded temperature and salinity in Milne Fiord over winter and measured the currents in the fiord in an effort to understand how the ice shelf might be influenced by the ocean. Our water profiling measurements also indicate that the previous freshwater lake at the rear of the Petersen Ice Shelf has now been lost.
- The weather station located in Purple Valley (established in 2009) was serviced and a new snow depth sensor added. This station provides the only source of near real-time weather information for northern Ellesmere Island, and can be accessed by the public at <http://tinyurl.com/milnewx>.

In addition to fieldwork, we presented our science to students at Qarmartalik School in Resolute Bay in May. Our presentation included a demonstration and activities that related to the concept of density. Over the summer we monitored the Ellesmere ice shelves using satellite imagery. These showed that the Ward Hunt Ice Shelf continued losing mass, that there was extensive fracturing at the rear of the Milne Ice Shelf, and that the Petersen Ice Shelf lost 5.5 km². Since 2005 the Petersen Ice Shelf has decreased in area from 49 km² to less than 20 km² today.