Project Title: **Environmental mineralogy and geochemistry, South Fiord, Axel Heiberg Island, Nunavut**

Principal Investigator: Marie-Claude Williamson, Geological Survey of Canada

Project Location: Axel Heiberg Island, Nunavut

Timeframe: July 3 – 30, 2013

Project Description

The project goal is to determine how the metals contained in mine waste are dispersed in the ground and local streams in an area where permafrost encloses the waste. To reach this goal, we identify and map rust-coloured deposits or 'gossans' that are unusually rich in copper and iron. In some cases, gossans are comparable to the mine waste deposits that result from the extraction of metals for industrial purposes. The natural occurrences found on Axel Heiberg Island have the advantage of being in contact with permafrost for thousands of years. As a result, we can observe the effects of long-term processes affecting these materials, the enclosing permafrost, and the local streams and lakes. A better understanding of these processes will allow us to design effective and safe ways of containing mine waste in the Arctic environment.

Field Operations

A team of 4 geologists will be transported to the field site by Twin Otter aircraft and helicopter from Resolute in early July 2013. Only one field camp will be established for the duration of the field season that consists of a kitchen tent, office tent, and 4 Eureka (personal) tents. The site will be restored to it's original state prior to departure. Geological mapping and sampling will be carried out during foot traverses from the base camp on western Axel Heiberg Island. At the end of the field campaign, the field crew will sample stream sediments and gossans over a larger area with support from a dedicated helicopter.

The types of samples collected will include rocks, soils, stream sediments, and water. Land-based sampling methods are limited to the outcrops of rock and specific soil horizons that are measured and sampled from small trenches dug out at gossan localities. All the samples collected will be ferried back to Resolute by helicopter and Twin Otter aircraft for shipping to Ottawa.

The field and laboratory data and results of the project will be published in the form of maps, government reports and articles, conference presentations, and journal papers. The project will be described for the Nunatsiaq News and the PCSP Science Report. We are currently looking for

ways to meet and work with the students of Qarmatalik School in Resolute Bay with assistance from the Canada-Nunavut Geoscience Office in Iqaluit. We are also in contact with Hugh-John MacIsaac, Nunavut Department of Economic Development & Transportation, Cambridge Bay, to develop an outreach project intended for display at the PCSP Open House 2014.