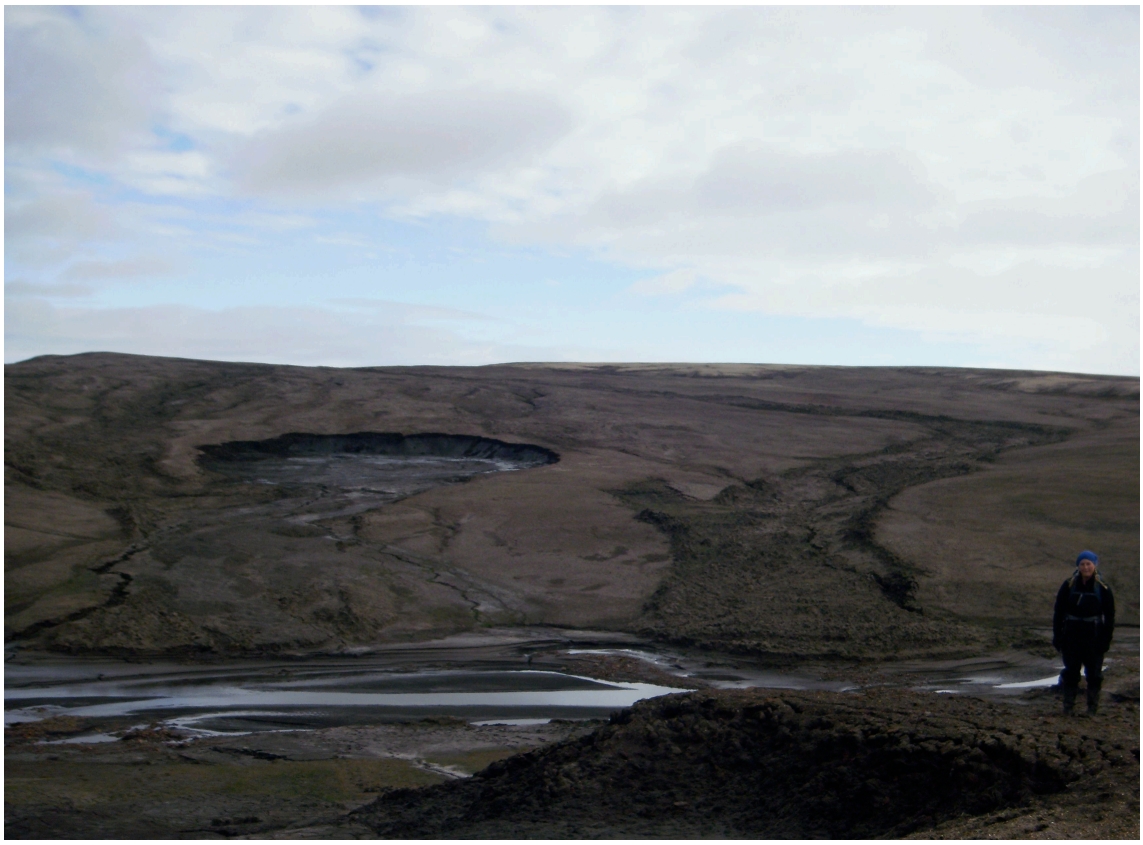
Report of 2011 Field Activities
Drake Point, Sabine Peninsula, Melville Island

High Arctic permafrost landscape stability and water quality, Sabine Peninsula, Melville Island, Nunavut



Dr. Melissa Lafrenière
Department of Geography
Queen's University, Kingston, ON K7L 3N6
Phone 613-533-6000 x 78720
Email: Melissa.lafreniere@queensu.ca

Nunavut Science Research Licence 02 063 10N-A

February 29, 2012

2001 Field Activities
In the summer of 2011, we investigated of water chemistry, permafrost disturbances, soil moisture, and vegetation mapping and characterization across a large study area (150 km^2) near Drake Point, Melville Island.76 deg 27' N, 108 deg 33' W). The field season was approximately 5 weeks in duration (July 1st- to August 5^{th}) and the size of camp varied between 2 to 5 people over the season. Our new field site was located near Cape Collingwood (76°30'4" N, 108°39'20"W), where there was a reliable air strip.. .

We collected water and sediment samples from streams and rivers across the study area. We also mapped landslides and permafrost disturbances, and drilled holes in the soil and frozen ground to measure the ice content in areas with different types of bedrock and soils. This is important to help us understand why disturbances occur in some areas and not others. We also collected soil moisture data on site and retrieved some samples to use to characterize the physical properties of the soils. Additionally we collected information on the abundance and distribution of vegetation and on the spectral reflectance of plants as they grow through the season.

Community activities
We have not met with the community to discuss our work, as we have few results to share yet. We are still processing satellite images, field data and samples from 2011. M. Lafrenière plans to arrange to meet with community members in July of 2012, ahead of the 2012 field season

Preliminary results
The disturbance mapping reveals there are only a couple very recent disturbances in the area. The greatest area and number of disturbance were found in the shale bedrock units. These bedrock types were also found to have the greatest ice content, which likely plays an important role in the formation of landslides and other disturbances. We found there was a lot of difference in the chemistry of water across the study area. Some streams have very acidic waters with a lot of dissolved minerals, and other streams were not acidic and had almost no dissolved rock minerals. The water chemistry varies greatly between bedrock types. Within a given bedrock type there is some evidence that the presence of landslides or other disturbances is affecting the chemical composition of the waters, but disturbance does not influence water quality in all cases. Further sampling is required to better understand in what situations disturbance affects water quality, and what processes are controlling the changes in water chemistry.

Proposed activities for 2012
Field activities in 2012 will focus on characterizing the spatial distribution and chemical characteristics of ground ice and recently exposed ice. We will study several recent landslide sites in detail, and drilled holes in the soil and frozen ground to characterise ice content and chemical composition of ice in different bedrock types. Additionally we will sample stream water in order to better characterise the impact of bedrock type and disturbance on water quality. We will have 2 people in camp from July 15^{th} to July 30^{th} , 2012. We will continue to use the satellite imagery and field data from 2011 to complete the map of landscape stability, and map the variations in surface soil moisture and vegetation communities across the study area and to investigate how these change with disturbances and bedrock types.