8WLC-BGI1516 - Dynamics and Change of the Devon Ice Cap

Summary report for Use of Waters or Deposit of Waste Without a License

Summary: The Devon Ice Cap, Qikiqtani Region, Nunavut, was visited from April 29 to June 7, 2015 for scientific research by 5 members from the University of Alberta and one member from the University of Calgary. A minimal camp was set up at the ice cap summit (see table 1 for camp locations).

Project description: The goal of the research is to describe and explain how the Devon Ice Cap responds to climate warming and contributes to global sea level rise. We are investigating (i) how fast the ice cap is losing mass, (ii) how much do surface melting and iceberg calving contribute to mass loss, (iii) how do processes in the ice cap's firn layer delay runoff of meltwater to the ocean, and (iv) how do processes by which different glaciers flow affect the rate at which they lose mass? Fieldwork is necessary to answer these questions. Our fieldwork involves (a) calibrating and validating measurements of ice thickness and flow made by remote sensing and (b) measuring changes in ice cap mass, the properties of snow, firn, and ice, and the rates of glacier flow, meltwater production, and iceberg calving.

Scientific work and impacts: The Devon Ice Cap was accessed from Resolute Bay via Twin Otter Aircraft. Our camps are minimal with no permanent structures. Tents are set up and taken down every year. Travel on the ice was primarily by snowmobile. A helicopter stationed at the summit between May 4 and May 6 2015 was used to access the marine terminus of the Belcher Glacier. Scientific instruments were removed from the Belcher Glacier including small air temperature sensors, global positioning systems (GPS), and time lapse cameras. All instruments currently installed in the ice will be removed at the completion of the project (estimated to continue until 2017).

Fuel: Aircraft are serviced and maintained by Kenn Borek Air Ltd. in Resolute Bay so there is no waste disposal or use of water by the aircraft. Fuel for the helicopter was stored temporarily at the Devon Ice Cap Summit. Fuel for the snowmobiles was stored in fuel drums at the Devon Ice Cap Summit and in 20L Jerry cans whilst in small satellite camps. When re-fuelling snowmobiles and transferring fuel from fuel drums to Jerry Cans, plastic drip trays were placed under the fuel pump and/or Jerry Can. Fuel from drip trays was transferred back into the fuel containers. Our spill contingency plan, prepared in December 2010 in accordance with the Consolidation of Spill Contingency Planning and Reporting Regulations R-068-93, as set by the Nunavut Water Board, with regard to our previous license 3BC-BGI0831 was reviewed by all participants prior to departure and a copy was carried with each field team. Spill kits were on hand but no spills occurred.

Water use and waste: We aimed to minimize the impact of our scientific research by keeping the camp locations clean, using minimal water (0.03cu.m/day per person), and backhauling solid waste to Resolute. Melted snow was used for drinking and domestic use. Greywater, which consisted of water from washing and cooking, was disposed as per Schedule 1, Item 3. To minimize water use, dishes were cleaned without water as much as possible. Solid food waste was removed from any greywater prior to disposal and disposed of with the solid waste. Summary of amount and type of waste is found in the accompanying excel file *'Annual reporting form for 8WLC-BGI1516_2015'.*

Camp locations: see also accompanying document *'NWB Annual Reporting form 8WLC-BGI1516_2015'* for water source and waste disposal sites.

Camp name	# of people	Dates (2015)	Latitude	Longitude
Summit Camp	4-6	Apr 29-Jun7	75°34'115"	-82°67'6"
Belcher Glacier Camp	2	May 14-17	75°53'46"	-81°47'15"
Sverdrup Camp	2	May 2-11	75°20'29"	-82°40'3"
Western Margin Camp	2	Jun 2-6	75°21'52"	-84°41'56"
Southeast 6 Camp	2	May 21-25	75°08'25"	-80°26'26"

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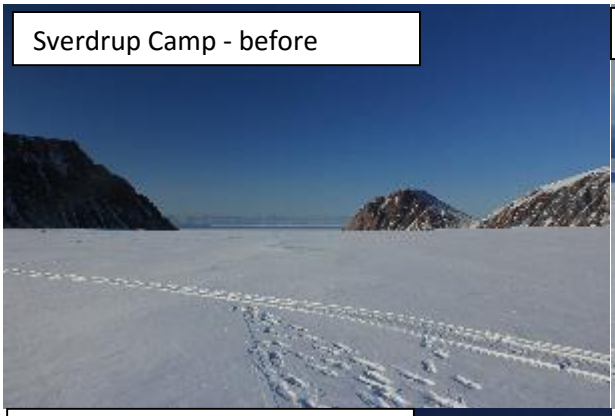
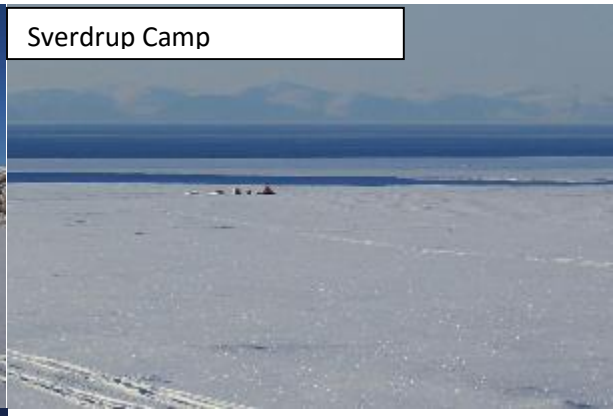
Supporting photographs

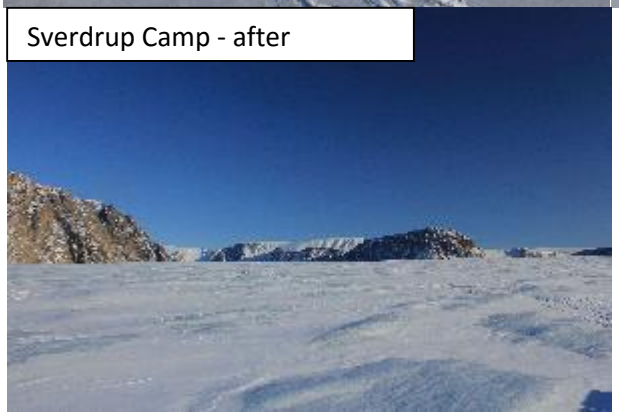
Sverdrup Glacier Camp, Devon Ice Cap



Sverdrup Camp - before



Sverdrup Camp



Sverdrup Camp - after

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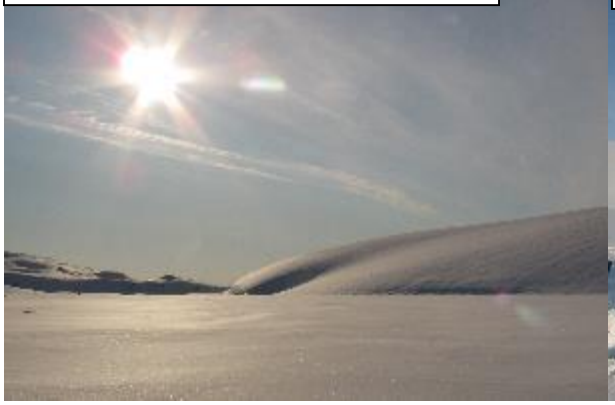
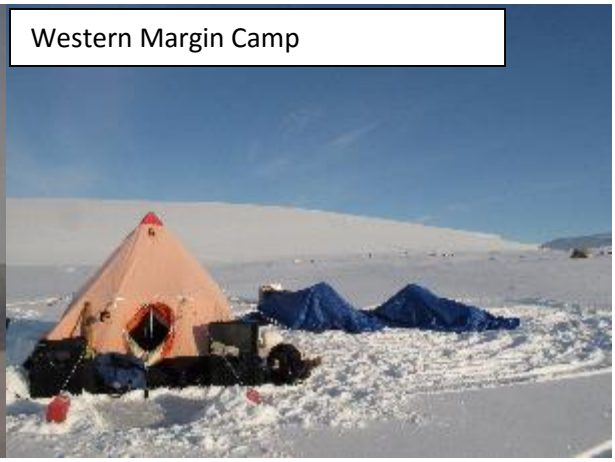
Western Margin Camp, Devon Ice Cap

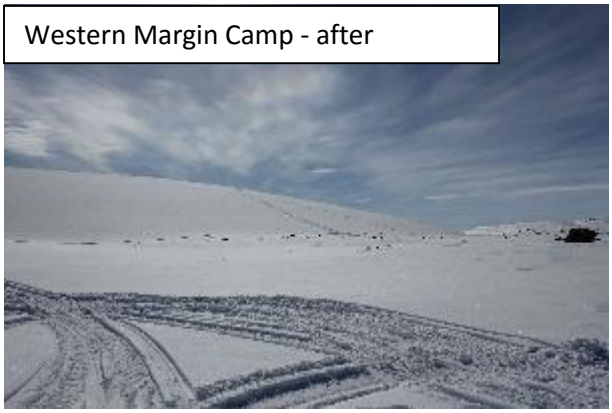
Western Margin Camp - before



Western Margin Camp



Western Margin Camp - after



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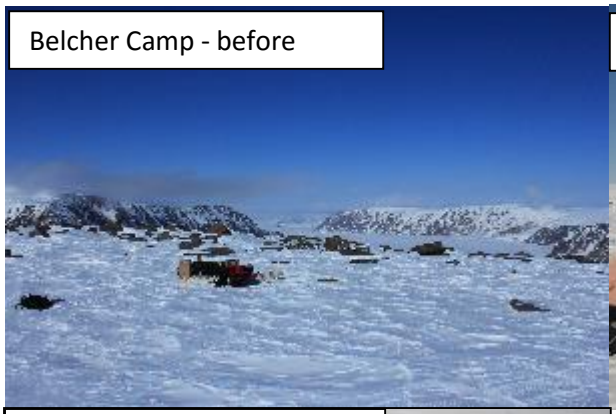
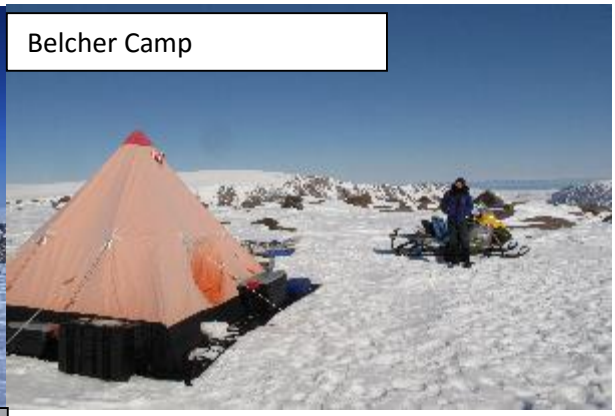
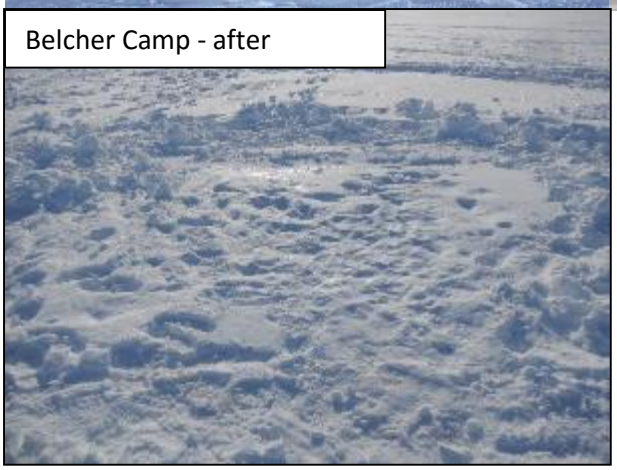
Belcher Camp, Devon Ice Cap


Belcher Camp - before


Belcher Camp


Belcher Camp - after

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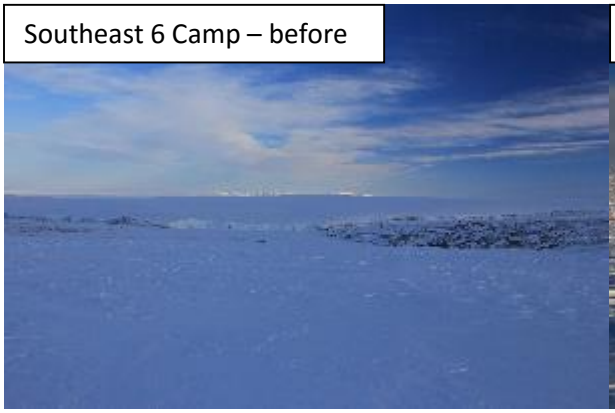
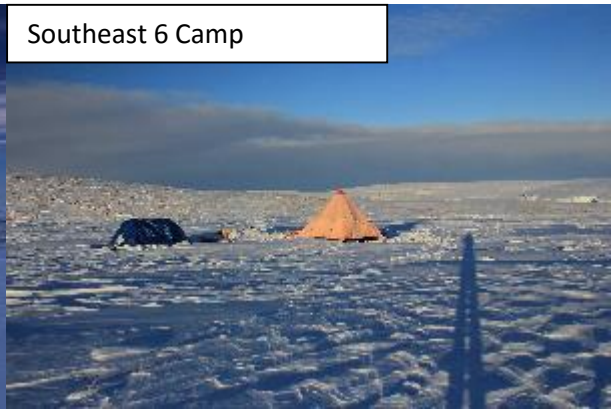
Southeast 6 Camp, Devon Ice Cap

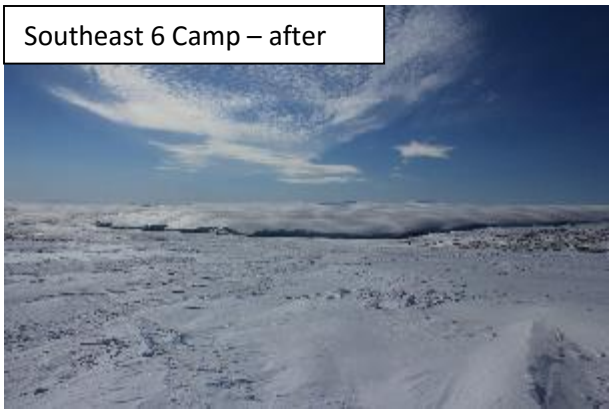
Southeast 6 Camp – before



Southeast 6 Camp



Southeast 6 Camp – after



Summit Camp, Devon Ice Cap