

Project Dashboard

Investigating the Devon Ice Cap subglacial lakes (149426)

Proposal Status: Conformity Determination Issued

Overview

Documents

Correspondence

Questionnaire

Project Overview

Type of application: **Amendment**

Proponent name: Siobhan
Company: University of Waterloo

Schedule:

Start Date: 2021-04-01
End Date: 2021-07-31
Operation Type: Seasonal

Project Description:

A recent study revealed the first evidence for a hypersaline subglacial lake complex beneath Devon Ice Cap, Canadian Arctic using airborne geophysical survey methods. These lakes are salty enough that they can exist at temperatures of -10.50C where freshwater would rapidly freeze. As such, the lakes are globally unique and may represent a microbial habitat, which makes them compelling targets to ask fundamental questions about the existence, evolution and diversity of life in extreme environments on Earth and on other icy planetary bodies in the Solar System. The airborne geophysical data collected to date is highly effective at locating the upper surface of the lakes however, the airborne geophysical signals cannot penetrate through the lake. Therefore, to map the lake thickness, properties (e.g. salinity) and investigate the structure beneath the lake, multiple surface-based geophysical methods must be used. On Devon Ice Cap we plan to acquire three ground-based geophysical techniques: acoustics to map the lake thickness, time-domain electromagnetics to determine the lake properties, and magnetotellurics to investigate the structure and hydrology system beneath the lakes. Additional, the field team who are working on the Devon Ice Cap project are also part of a major geothermal energy initiative funded by NSERC. Geothermal energy can provide an efficient and low carbon source of energy. In the Canadian Arctic, ongoing research is investigating how subsurface heat could be used in Nunavut for direct heating of buildings which would greatly reduce oil and gas consumption. The electromagnetic instruments can image the subsurface to ~2 km depths and greatly assist in the selection of locations for drilling geothermal wells. This geophysical survey around Resolute Bay would also provide opportunities for outreach to the community and school.

Summary of Modifications:

- Change in geophysical data acquisition: The previous fieldwork used airborne geophysical surveying methods. For this project, we plan to use non invasive ground-based geophysical methods: acoustics, time-domain electromagnetics and magnetotellurics. - Remote field camp: Previous fieldwork was based out of the Polar Continental Shelf Program (PCSP) in Resolute Bay. For this project, we will perform the ground-based surveys from a field camp on Devon Ice Cap. Our camps are minimal



with no permanent buildings or structures. To minimize the impacts of our research activities every effort is made to keep the camp clean. - Water use: We estimate a total water use for our five person field party of 0.15 cu m/day (for ~16 days in the field). Melted snow is used to provide water for domestic use.

Personnel:

Persons:	5
Days:	27

Project Map

Project Land Use and Authorizations

Material Use

Waste and Impacts

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