

Public Registry - Project Proposals

NPC 150440: Land-research - GEOEO expedition

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Proposal Status: Conformity Determination Issued

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Type of application: New

Proponent name:

Love Dalen

Proponent company:

Stockholm University

Project Description:

This application concerns the land research activities of the North Green Earth Ocean Ecosystem Observatory (GEOEO) expedition endorsed by the Swedish Polar Research Secretariat (SPRS). The main goal is to study prehistoric changes in Greenland, but depending on sea-ice conditions, some activities might be needed in Canada. The Arctic has a complex history of species colonization and extinction. We hope to uncover more of this history, such as the arrival and disappearance of muskox, and how climate changes affected marine ecosystems. One aspect of the project will use a palaeogenomic approach, where DNA from ancient materials is analyzed to explore ecosystem changes in marine and terrestrial environments. We will mainly focus on DNA from sediments, especially from lake bottoms. Sampling lake sediment cores will be done using a custom-built raft and Nesje coring system. We will also collect already dead animal bones and teeth, and ancient plant material for DNA analysis. No live animal will be collected. Initial DNA analyses will be done onboard Oden, with more in depth DNA sequencing done after the end of the expedition at the Centre for Palaeogenetics in Stockholm. A second part of the project will focus on creating a database of high-resolution sensitive proxies using driftwood and shrub samples, and to use this data to provide a novel field reconstruction of temperature for the northernmost land latitudes. When driftwood is found, samples in the form of discs cut across the growth rings will be collected with a chainsaw. The remaining wood material will be left in their original positions, and we aim to leave as little trace from the

sampling as possible. We will also sample deciduous and evergreen Arctic tundra dwarf shrub species with easily identifiable annual growth rings, and which have previously been used for dendrochronological studies. These species include *Salix* spp., *Betula nana* and *Cassiope tetragona*. Shrubs will be collected in elevational transects from both moist and dry sites so that we can extract both temperature and hydroclimate information. To determine the maximum number of annual growth rings, and thus absolute plant ages, both the continuous below- and aboveground root and stem system of each specimen will be excavated. This will also allow for assessing the impact of anomalously high summer temperatures on growth. Another part of the project focuses on long-term geological history. The region has a unique and undisturbed Proterozoic-Paleozoic section of the so-called passive margin of the palaeocontinent Laurentia (proto-northern America), which we aim to study to understand how continental margins form. We will collect sedimentary and metamorphic rocks from this northern region, sampling loose rocks to minimize landscape disturbance. We will use various analytical techniques, including light microscopy and mass spectrometry, to analyze these rocks and create a crust-mantle model of the region. Sampling locations will depend on the icebreaker Oden's route and weather conditions. All activities will be carried using the icebreaker Oden as our base, with short helicopter trips to the terrestrial sites. Various trips (up to 15) could be taken between August 1, 2024, and September 30, 2024, depending on sea-ice conditions and Oden's route, and will involve up to 10 of the researchers onboard Oden. There will be no overnight stays and no camp will be established. The nearest community of Grise Fjord is approximately 500km from the suggested field sites; therefore, no community should be affected by our activities. We will avoid sensitive areas such as the Quttinirpaaq National Park and designated polar bear denning areas.

[Project Schedule](#)

Start Date:

2024-08-01

End Date:

2024-09-30

[Project Map](#)

List of project geometries:

Id
Geometry
Location Name

[12564](#)

polyline

Northern tip of Ellesmere

[12565](#)

polyline

Coast of Ellesmere

NPC Planning regions:

North Baffin

Project Land Use and Authorizations

Project Land Use:

Scientific Research

Scientific Research

Licensing Agencies:

Nunavut Research Institute

Government of Nunavut - Department of Environment

Government of Nunavut - Department of Culture and Heritage

Nunavut Impact Review Board

Material Use

Equipment:

	Type
	Quantity
	Type
	Use

Chainsaw

1

2 cubic meters

Will be used to cut up disk samples of driftwood

Coring raft

1

10 x 10 m

Used for lake sediment coring, consist of 2 zodiac boats, a platform, a tripod, a winch system, and a Nesje coring system (6m x 10cm rod)

Fuel Use:

	Type
	Container
	Capacity
	Use

No data found

Hazardous Material and Chemical Use:

Type
Container
Capacity
Use

No data found

Water Consumption:

Daily Amount (m ²)
Retrieval Method
Retrieval Location

0

Waste and Impacts

Environmental Impacts:

For our land activities, we will operate under a “leave no trace” ethic to minimize our impact on the land. We will use proper storage and transportation for all our waste. All waste will be brought back on the vessel. Our vessel has the most advanced waste water and waste management system. No waste or waste water will be discharged at sea. All waste will be retained on board until the vessel reaches port where disposal is authorized.

Waste Management:

Waste Type
Quantity Generated
Treatment Method
Disposal Method

No data found