NIRB Application for Screening #126137

Permafrost organic carbon fluxes to the Canadian Arctic Ocean

Application Type: New

Project Type: Scientific Research

Application Date: 2/17/2025 10:33:27 AM

Period of operation: from 2025-06-01 to 2028-04-01

Project Proponent:

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DETAILS

Non-technical project proposal description

English: This scientific research project led by professor Stephanie Kusch (University of Quebec Rimouski) will investigate changes in permafrost organic carbon remineralization and erosion in response to climate change. Activities performed by a team of 3 university researchers during the duration of the project (yearly sampling in summertime from 2025 to 2028) include permafrost soil sampling to study greenhouse gas production and organic matter transformation as well as sampling of marine sediments to study erosion of permafrost organic carbon into the ocean and oceanic feedback mechanisms. Soil samples will be taken from small 15x15cm soil pits reaching the permafrost table and sediments will be taken using small grab samplers. Samples will be brought back to the laboratory at the University of Quebec Rimouski for direct analysis and long-term incubations in the laboratory.The observations made in this research project will be linked to longer sediment records to understand past permafrost dynamics beyond observational records, which allows assessing the sensitivity and response of permafrost OC to natural climatic as well as anthropogenic forcing and helps predicting the future response of permafrost to climate change. This research will aid the community of Qikiqtarjuaq better understand on-going changes in the environment and their fishing and hunting grounds.

French: Ce projet de recherche scientifique dirigé par la professeure Stephanie Kusch (Université du Québec Rimouski) étudiera les changements dans la reminéralisation du carbone organique du pergélisol et l'érosion en réponse au changement climatique. Les activités réalisées par une équipe de 3 chercheurs universitaires pendant la durée du projet (échantillonnage annuel en été de 2025 à 2028) comprennent l'échantillonnage du sol du pergélisol pour étudier la production de gaz à effet de serre et la transformation de la matière organique, ainsi que l'échantillonnage des sédiments marins pour étudier l'érosion du carbone organique du pergélisol dans l'océan et les mécanismes de rétroaction océanique. Les échantillons de sol seront prélevés dans de petites fosses de 15 x 15 cm atteignant la table du pergélisol et les sédiments seront prélevés à l'aide de petites bennes. Les observations faites dans le cadre de ce projet de recherche seront reliées à des enregistrements de sédiments plus longs afin de comprendre la dynamique passée du pergélisol au-delà des enregistrements d'observation, ce qui permettra d'évaluer la sensibilité et la réponse du pergélisol OC aux forçages climatiques naturels et anthropogéniques et aidera à prédire la réponse future du pergélisol au changement climatique. Cette recherche aidera la communauté de Qikiqtarjuaq à mieux comprendre les changements en cours dans l'environnement et dans leurs territoires de pêche et de chasse.

Inuktitut: Taanna qaujisarniq sivuliqtiulluni ilisaijimmarimmut Stephanie Kusch (silattuqsarvigjuaq kupaik rimuuskimi) qaujisarniaqtuq asijjirniujunik quangujumi pujurlungmik ujarangniakkannirnirmik ammalu nunguppallianirmik kiujjutaulluni silaup asijjiqpallianinganut. Piliriangujut kamagijaujut pingasunut silattuqsarvigjuarmi qaujisaqtinut piliriangutillugu (arraagutamaat uukturainiq aujakkut 2025-mit 2028-mut) ilaqaqput quanguinnaqtumik nunamik uukturainirmik qaujisarnirmut uunaqsivalliajumik gaasimik saqqittinirmik amma uumajuit asijjiqpallianinginnik ammattauq uukturainirmik imarmiutanik siurarnik qaujisarnirmut nunguppallianinginnik quanguinnaqtut quanguinnaqtut Aulaningit. Nunaup qaujisaqtauningit pijauniaqtut mikijunik 15x15cm nunaup qaanganiittunik tikiutijunik quanguinnarniaqtumut ammalu siurait pijauniaqtut aturlutik mikijunik tigusijjutinik. Qaujisaqtaujut utiqtitauniaqtut qaujisarvingmut silattuqsarvigjuangani kupaik rimuuski turaakautigijumik qaujisaqtauniarmata ammalu akuniujukkut uunaqsititauniarmata qaujisarvingmi.Ujjirijaujut tavvani qaujisarniujumi aktuaniqarniaqtut takiniqsanut tininniujunut titiraqtausimajunut tukisiumajauqullugit kingunittinni quanguinnaqtuq qanuilinganirilauqtanga ungataanut takujausimajut titiraqtausimajut, piviqaqtittijuq qaujisarnirmik ikpigusungninganik ammalu kiujjutinganik quanguinnaqtuq OC silaup qanuinninganut ammalu inungnut saqqitauvaktunut ammalu ikajurniqarluni nalauktaarunnarnirmut sivuniksami kiuniriniaqtanganik quanguinnaqtuq silaup asijjiqpallianinganut. Taanna qaujisarniujuq ikajurniaqtuq nunaliujunik qikiqtarjuarmiunik tukisivaalliqullugit asijjiqpallianginnaqtunik avatimi ammalu iqalugasuarvigivattanginnik ammalu angunasuvvigivattanginnik.

Personnel

Personnel on site: 3

Days on site: 80

Total Person days: 240

Operations Phase: from 2024-12-08 to 2028-04-01
Operations Phase: from 2025-06-01 to 2028-04-01
Post-Closure Phase: from to

Activities

Location	Activity Type	Land Status	Site history	Site archaeological or paleontological value	Proximity to the nearest communities and any protected areas
Study area	Scientific/International Polar Year Research	Inuit Owned Surface Lands	Permafrost soils samples will be taken from small soil pits across the island following erosion trajectories such as valleys and channels	N/A	5km aerial distance
Study area	Scientific/International Polar Year Research	Marine	Sediment samples of 200ccm will be obtained from a zodiac/small boat in shallow near-shore settings off erosion trajectories such as valleys and channels	N/A	aerial distance 5km, samples will be obtained within 100m from the coast.

Community Involvement & Regional Benefits

Community	Name	Organization	Date Contacted
Qikiqtarjuaq	Geela Kooneeliusie	hamlet Qikiqtarjuaq	2025-02-03

Authorizations

Indicate the areas in which the project is located:

Authorizations

Regulatory Authority	Authorization Description	Current Status	Date Issued / Applied	Expiry Date
Hamlets and Municipalities	Consultation with hamlet and hunters and trappers organization on 2025-02-03 in Qikiqtarjuaq. Project well received by both organizations. Support letters to be issued.	Applied, Decision Pending		

Project transportation types

Transportation Type	Proposed Use	Length of Use
Water	boat	
Land	ATV, by foot	

Project accomodation types

Community

Other,

Material Use

Equipment to be used (including drills, pumps, aircraft, vehicles, etc)

Equipment Type	Quantity	Size - Dimensions	Proposed Use
ATV	2	50x50x80inch	Transport across island to individual sampling sites, transport of material and samples; to be rented on site
boat	1	unknown	sampling of surface sediment with grab sampler

Detail Fuel and Hazardous Material Use

Detail fuel material use:	Fuel Type	Number of containers	Container Capacity	Total Amount	Units	Proposed Use
Gasoline	fuel	6	40	240	Liters	Operation of ATV; fuel to be bought on site from outfitter

Water Consumption

Daily amount (m3)	Proposed water retrieval methods	Proposed water retrieval location
0		

Waste

Waste Management

Project Activity	Type of Waste	Projected Amount Generated	Method of Disposal	Additional treatment procedures
Information is not available				

Environmental Impacts:

The environmental impact of this project is minimal. Soil pits will be opened with knifes and shovels and closed after subsamples have been taken; surface vegetation will be used to close pits, small depressions of the ground (15x15cm) are expected. All soil and sediment samples will be transported back to the laboratory in Rimouski. No treatment of samples on site / no use of chemicals.

Additional Information

SECTION A1: Project Info

SECTION A2: Allweather Road

SECTION A3: Winter Road

SECTION B1: Project Info

SECTION B2: Exploration Activity

SECTION B3: Geosciences

SECTION B4: Drilling

SECTION B5: Stripping

SECTION B6: Underground Activity

SECTION B7: Waste Rock

SECTION B8: Stockpiles

SECTION B9: Mine Development

SECTION B10: Geology

SECTION B11: Mine

SECTION B12: Mill

SECTION C1: Pits

SECTION D1: Facility

SECTION D2: Facility Construction

SECTION D3: Facility Operation

SECTION D4: Vessel Use

SECTION E1: Offshore Survey

SECTION E2: Nearshore Survey

SECTION E3: Vessel Use

SECTION F1: Site Cleanup

SECTION G1: Well Authorization

SECTION G2: Onland Exploration

SECTION G3: Offshore Exploration

SECTION G4: Rig

SECTION H1: Vessel Use

SECTION H2: Disposal At Sea

SECTION I1: Municipal Development

Description of Existing Environment: Physical Environment

Description of Existing Environment: Biological Environment

Description of Existing Environment: Socio-economic Environment

Miscellaneous Project Information

Identification of Impacts and Proposed Mitigation Measures

Cumulative Effects

Impacts

Identification of Environmental Impacts

	PHYSICAL	Designated environmental areas	Ground stability	Permafrost	Hydrology / Limnology	Water quality	Climate conditions	Eskers and other unique or fragile landscapes	Surface and bedrock geology	Sediment and soil quality	Tidal processes and bathymetry	Air quality	Noise levels	BIOLOGICAL	Vegetation	Wildlife, including habitat and migration patterns	Birds, including habitat and migration patterns	Aquatic species, incl. habitat and migration/spawning	Wildlife protected areas	SOCIO-ECONOMIC	Archaeological and cultural historic sites	Employment	Community wellness	Community infrastructure	Human health
Construction																									
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Operation																									
Scientific/International Polar Year Research			-	-	M	-	-	-	-	-	-	-	-	-		-	-	-	-	-		-	-	-	-	-
Decommissioning																									
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(P = Positive, N = Negative and non-mitigatable, M = Negative and mitigatable, U = Unknown)