NIRB Uuktuutinga Ihivriuqhikhamut #125700

ICAAP Increasing Carbon Accumulation in Arctic Peatlands

Uuktuutinga Qanurittuq: New

Havaap Qanurittunia: Scientific Research

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QANURITTUT

Tukihiannaqtunik havaariyauyumayumik uqauhiuyun

Qablunaatitut: Non technical project descriptionICAAP – Increase Carbon Accumulation in Arctic PeatlandsPrincipal Investigator: Prof. Angela Gallego Sala, University of Exeter, UK.In collaboration with researchers from Université du Québec à MontréalResearch ObjectivesWe aim to better understand the carbon dynamics of Arctic peatlands. Currently, there is a lot of uncertainty as to whether under present and future warming these habitats will expand and/or absorb more carbon from the atmosphere, or the reverse.Research questions•Have Arctic peatlands increased carbon accumulation and/or expanded laterally in response to warming past climates in the last several hundreds of years and over the satellite period?•Will future climate change result in an increase of the Arctic peatland carbon store as a result of increases in accumulation and extent?•How do our datasets compare to a land surface model that incorporates dynamic peatlands?Field work schedule overviewField work, including the peat core sampling and drone data collection, was carried out in 2019 in Svalbard (July) and in Lapland (August) in Europe. Field work in Canada was due to take place in 2020, but was delayed due to the pandemic. Thanks to a funded extension, we are still able to try to get field data from the Canada sites this year (2022) as a last chance to complete the dataset. We aim to visit the Pond Inlet area in July (18th to 26th) to sample 4 sites located not far from Pond Inlet (but not in the Sirmilik National Park boundary). Methods for field workWe will collect soil samples at four sites for the Pond Inlet field work. A central core from each site will be used to estimate changes in peat accumulation rates. Bulk density, carbon and nitrogen analyses will be measured in 1cm depth increments. Full chronologies will be determined using carbon-14 dates, and 210Pb analyses. These will be used to derive estimates of peat accumulation rates over the past millennium and the last 150 years. Transects from mineral ground to shallow peat at the edges of sites will also be sampled to determine age and accumulation rates in order to consider rates and dating of lateral spread.In tandem with peat coring, we will fly a micro-drone to map the peat sites and characterise the microtopography and vegetation characteristics from the centre to edges of the peat bogs. This light micro-drone is less than 250g total take-off weight, so does not require registration or a pilot certificate. Methods remote sensing and modellingAlongside field work, we are also carrying out analysis of changes in productivity and extent in the Arctic peatlands sites over the last 35 years using satellite data. We will finally compare all our datasets to land surface models to find whether they capture the dynamics we have measured.Impacts of the research No detrimental impacts are envisaged in the field work. We will ensure however to not disturb any wildlife whilst accessing the field sites, and to be conscientious when flying the drone. Data storage and managementAll datasets (peat core and remote sensing data) will be made available on public repositories for use by the scientific community. This will be done to coincide with publication of our findings. Are Nunavut residents involved in the research?No Nunavut residents are currently involved.How research results will be shared in Nunavut?The research will be published in Open Access journals, meaning that any results (and datasets) from the work will be freely available to anyone who would like to read it, including Nunavut residents. As part of our project we are preparing a MOOC (Massive Open Online Course) in English entitled "Arctic Ecosystem and Climate Change" concerned with the shrinking Arctic environment in response to future warming, and particularly with peatlands ecosystems and carbon storage. We are also willing to provide a presentation of our work to the public in Pond Inlet during the field work dates if that is of interest.

Uiviititut: This project is not in the Iqaluit area - so the french translation was not requested

Inuktitut: ᐅᖃᐅᓯᖅᑐᙱᑦᑐᖅ ᐱᔭᒃᓴᕆᔭᒧᑦ ᐅᓂᒃᑳᓕᐊᖅICAAP – ᐊᖏᓕᒋᐊᖅᑐᖅ ᐆᒪᔪᕕᓃᑦ ᕿᒻᒪᒃᑯᖏᑕ ᑲᑎᑉᐸᓪᓕᐊᓂᖓ ᐅᑭᐅᖅᑕᖅᑑᑉ ᐃᒪᖅᓯᖃᓐᓂᖏᒍᑦ ᖃᐅᔨᓴᖅᑎᓪᓗᐊᑕᖅ: ᐃᓕᓴᐄᔨᒻᒪᕆᖓ. ᐊᓐᔨᓚ ᒐᓖᒍ ᓵᓚ, ᓯᓚᑦᑐᖅᓴᕐᕕᔾᔪᐊᖓ ᐃᐊᒃᓰᑕᐅᑉ, ᐃᖕᓚᓐᒥᑦᑲᑐᔾᔨᖃᑎᖃᖅᑐᑦ ᖃᐅᔨᓴᖅᑎᓂᒃ ᓯᓚᑦᑐᖅᓴᕐᕕᔾᔪᐊᖓᑕ ᑯᐸᒃ ᑕᐃᑲᓂ ᒨᕆᐅᓪᒥᑦ ᖃᐅᔨᓴᖅᑕᒃᑯᑦ ᑕᑯᒃᓴᕈᕋᓱᒃᑕᑦ ᑐᕌᒐᖃᖅᑐᒍᑦ ᑐᑭᓯᕚᓪᓕᕋᓱᓐᓂᒻᒥᒃ ᐆᒪᔪᕕᓃᑦ ᕿᒻᒪᒃᑯᖏᑦ ᐊᐅᓚᓂᖃᓰᖑᓂᖏᑕ ᐅᑭᐅᖅᑕᖅᑑᑉ ᐃᒪᖅᓯᖃᕐᕕᖏᒍᑦ. ᐅᓪᓗᒥᓕ, ᖃᐅᔨᒪᔭᐅᓗᐊᙱᒻᒪᑦ ᖃᓄᖅ ᐅᓪᓗᒥᐅᔪᒧᖅ ᓯᕗᓂᑦᑎᒍᓪᓗ ᐅᖅᑰᓯᓐᓂᕈᑎᒃ ᑕᒪᒃᑯᐊ ᓇᔪᒐᕆᔭᐅᔫᑦ ᓂᔾᔪᑎᓄᑦ ᐊᖏᓕᒋᐊᓐᓂᐊᒻᒪᖔᑕ ᐊᒻᒪ/ᐅᕝᕙᓗ ᐃᑯᐊᓪᓚᒃᑕᕕᓂᓐᓄᑦ ᑐᖅᑯᐄᒐᔭᒻᒪᖓᑕ ᓯᓚᒥᑦ ᑲᑕᒑᔪᓂ, ᐊᓂᐋᑎᑦᑎᒪᑕᓅᓐᓃᑦ. ᖃᐅᔨᓴᖅᑕᒧᑦ ᐊᐱᖅᓲᑕᐅᔪᑦ •ᑕᒪᒃᑯᐊ ᐅᑭᐅᖅᑕᖅᑑᑉ ᐃᒪᖅᓯᖃᕐᕕᖏᑦ ᐊᖏᓂᖅᓴᒦᑦ ᑐᖅᑯᐃᓯᒪᓕᖅᐸᑦ ᐊᒻᒪ/ᐅᕝᕙᓗ ᓴᓂᒧᑦ ᐱᕈᖅᐸᑦ ᒪᓕᒃᓗᒍ ᐅᖅᑰᓯᒥᐊᖅᑎᓪᓗᒍ ᓯᓚᖓ ᐊᕐᕌᒍᓂᒃ ᐊᓂᒍᖅᑐᓂᒃ ᐊᒻᒪᑦᑕᐅᖅ ᖁᒻᒧᒃᑎᑕᐅᓯᒪᔪᑦ ᓴᓇᔭᐅᓯᒪᓕᖅᑎᓪᓗᒥᑦ? •ᓯᕗᓂᑦᑎᒍᑦ ᓯᓚᖓ ᐊᔾᔨᒥᔪᓐᓃᖏᓐᓇᕈᓂᐅᒃ ᓴᖅᑮᓂᐊᖅᐹ ᐊᖏᓕᒋᐊᕆᔪᒥᒃ ᐅᑭᐅᖅᑕᖅᑑᑉ ᐃᒪᖅᓯᖃᕐᕕᖏᑦ ᑐᖅᑯᐃᕙᓪᓕᐊᓂᖏᑕ ᑲᑕᒑᔪᓂᒃ ᒪᓕᓪᓗᒍ ᑲᑎᖅᓯᒪᐅᓕᓐᓂᖏᓅᑦ ᐊᖏᓂᖅᓴᐅᓕᓪᓗᑎᓪᓗᓐᓃᑦ?•ᖃᓄᖅ ᖃᕆᓴᐅᔭᒃᑯᑦ ᓇᓗᓇᐃᖅᓯᒪᔪᑦ ᓯᓕᓂᖃᖅᐸᑦ ᓄᓇᐅᑉ ᖄᖓᑕ ᑕᐅᑐᙳᐊᓕᐊᖑᓯᒪᔪᒥᒃ ᐃᓯᒪᑐᐃᓐᓇᒃᑯᑦ ᐊᐅᓚᓇᓯᒥᔭᐅᓂᕆᓰᖏᓄᑦ ᐃᒪᖅᓯᖃᕐᕕᐅᔪᑦ ᐃᔾᔪᖅᔾᔪᐊᖅᑐᓂᒃ? ᓄᓇᐃᓐᓇᒥᑦ ᓴᓇᔭᓄᑦ ᐅᓪᓗᖁᑎᖏᑦ ᑕᑯᓇᒃᖢᒥᑦ ᓄᓇᒥᒃ ᖃᐅᔨᓴᓐᓂᕗᑦ, ᐃᓚᖃᓐᓂᐊᖅᑐᑦ ᐅᑭᑦᑎᑦᑕᓐᓂᒻᒥᒃ ᐃᔾᔪᖏᓂᒃ ᐃᒪᖅᓲᒐᔪᒃᑐᑦ ᖁᒑᒍᓕᕋᒑᓪᓗ ᐊᔾᔨᓕᐊᖏᒍᑦ, ᑲᒪᒋᔭᐅᓂᑯᑦ 2019 ᐃᓗᐊᓂ ᓴᕚᓪᐸᐅᒻᒥ (ᔪᓚᐃ) ᓚᑉᓛᓐᒥᓪᓗ (ᐊᒡᒐᓯ) ᑕᕆᐅᔾᔪᐊᑉ ᐊᑭᐊᓂ. ᑲᓇᑕᒥ ᖃᐅᔨᓵᒃᓴᑦ ᑭᖑᕙᕆᐊᖅᖢᑎᒃ ᐊᕐᕌᒍᒥ 2020 ᖃᐅᔨᓵᖑᔪᒃᓴᑦ ᓄᕙᒡᔪᐊᖑᓂᕋᐃᑎᓪᓗᒥᑦ. ᑕᐃᒪᓕ ᑮᓇᐅᔭᒃᓴᑦ ᐅᖓᕙᕆᐊᖅᑕᐅᒻᒪᑕ, ᑲᔪᓯᔪᓐᓇᖅᓯᓪᓗᑕ ᖃᐅᔨᓵᕆᔭᒃᓴᓂᒃ ᑲᓇᑕᐅᑉ ᓄᓇᖁᑎᖏᓐᓂᒃ

ᐊᖏᕐᒍᑎᓴᖅᓄᑦ (2022) ᑭᖑᓪᓕᖅᑕᖓᔪᓕᒥᐅᑦ ᐃᓱᓕᔭᕐᑎᐅᖅᓴᖅᓯ ᓇᓗᓇᐃᖅᑕᐅᑭᓪᓕᖅᑕᐊᓱᓕᓂᒃ. ᒥᑦᑎᒪᑕᓕᐅᕐᓴ ᓂᓇᖅᓂᒃ ᑎᑭᑦᑐᒍᓴᑦ ᐃᓕᓴᕐᓂᒃ ᐱᓇᓱᐊᑭᓱᓂᒃ ᑎᓪᓗᓴᓂᒃ (18-26) ᒪᖏᖅᓂᒃ ᐱᓇᓱᐊᑭᓱᓂᒃ ᑎᓪᓗᓴᓂᒃ ᓂᓇᐅᔪᓂᒃ ᖃᐅᔨᓴᖅᑭᒪᓕᕐᓂᒃ ᐅᖅᓯᓕᐊᖏᑦᑐᑦ ᓂᓇᖅᓯᓂᒃ (ᑭᓱᓂᒃ Δ.ᓕᐊᓂᖅᓄᑦ ᒪᖏᖅᓂᒃ ᐃᓕᓴᕐᓂᒃ ᐅᖅᓯᓂᒃ ᐊᑐᓕ

Hulilukaarutit

Inigiya	Hulilukaarut Qanurittuq	Nunannga Qanurittaakhaanik	Initurlinga qanuritpa	Initurlinga utuqqarnitat unaluuniit Ingilraaqnitat Uyarannguqtut akhuurninnga	Qanitqiyauyuq qanitqiamut nunallaat kitulluuniit ahiruqtailiyainnit nuna
1 Pond Inlet west	Sampling sites	Inuit Owned Surface Lands	unknown	N/A	Pond Inlet
2 Pond Inlet east	Sampling sites	Inuit Owned Surface Lands	unknown	N/A	Pond Inlet
3 Pond Inlet south	Sampling sites	Inuit Owned Surface Lands	unknown	N/A	Pond Inlet
4 Inlet coast	Sampling sites	Inuit Owned Surface Lands	unknown	N/A	many kms from the edge of the Sirmilik national park
5 Glacial valley	Sampling sites	Inuit Owned Surface Lands	unknown	N/A	not in proximity. Site may be too distant to sample

Nunaliin Ilauyun, Aviktuqhimayuniitunullu Ikayuuhiarunguyun

Nunauyuq	Atia	Timiuyuq	Upluani Uqaqatigiyaungmata
Mittimatalik	David Stockley	Municipality of Pond Inlet	2022-04-21

Angiuttauvaktunik

Naunaiqlugu nunanga talvani havauhikhaq ittuq:

North Baffin

Angiuttauvaktunik

Munariniqmut Ayuittiaqtuq	Angirutinga Qanurittuq	Tadja Qanurittaakhaanik	Ublua Tuniyauyuq/Uuktuqtuq	Umikvikhaa Ublua
Nunavunmi Ihivriuqniqmut Timiqutigiyanga	As a scientific research activity we have applied to the NRI for a Natural/Physical science research permit (application date: 6 May 2022).	Applied, Decision Pending		

Project transportation types

Transportation Type	Qanuq Atuqtauniarmangaa	Length of Use
Water	will hire boat and pilot from Pond Inlet	
Land	will hire quad bikes and guide from Pond Inlet	

Project accomodation types

Nunauyuq

Ihuaqutivaluin Atuqtauyukhan

Hanalrutit atuqtaunahuat (ukuallu ikuutat, pampiutainnik, tingmitinik, akhaluutinik, hunaluuniit)

Hanalrutit Qanurittuq	Qaffiuyut	Aktikkulaanga – Qanurittullu	Qanuq Atuqtauniarmangaa
Quad	2	150cm x 220cm	To access the field sites that are not accessible by boat, and to transport field samples back to Pond Inlet (will hire these from local sources at Pond Inlet).
Boat	1	?	To access field sites near the coast, and to transport samples back to Pond Inlet. We will hire the boat from local sources at Pond Inlet
Micro drone	1	13x8x6 cm	To survey the topography and plant communities at our field sites This microdrone is less than 250g so does not require a pilots certificate or registration.
Peat corer	1	1m x 20cm	A tool designed to extract a peat soil core, inlcuding permanently frozen ground. Includes a small diesel-powered motor
soil sampler	1	20cm x 8cm	a metal hand tool used to cut and extract peat samples (not permanently frozen ground).

Qanurittuq Urhuqyuaq unalu Qayangnaqtut Hunavaluit Aturninnga

Qanurittuq urhuqyuaq hunavaluit aturninnga:	Urhuqyuaq Qanurittuq	Qaffiuyut qattaryut	Qattaryuk Aktikkulaanga	Atauttimut Qaffiuyut	Ilanga	Qanuq Atuqtauniarmangaa
Diesel	fuel	1	0.5	0.5	Liters	for the small motor on the peat corer

Imaqmik Aturninnga

Ubluq qanuraaluk (m3)	Aturumayain imavaluin utiqtittagaani qanuq	Atulirumayain imavaluin utiqtittagani humi
0		

Iqqakuq

Ikkakunik Munakgiyauyunik

Havauhikhaq Hulilukaarut	Qanurittuq Iqqakut	Ihumagiyauyuq Qanuraaluktut Atuqtait	Qanuq Iqqakuurniarmangaa	Halummaqtirarnirutikhan piyutin
Information is not available				

Avatiliriniqmut Ayurhautingit:

Predicted environmental impacts from our research are very low, as our sampling method is designed to minimise impacts. We extract peat cores, at around 8cm x 8cm squares, replacing around half of this sediment back into the cut hole. This cut area is expected to quickly fill with water and sediment, and cover over with vegetation naturally. Our team will be staying at Pond Inlet during the dates of our research and will employ a local guide, and hire a boat/quads from local businesses.

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

Qanurittuq Ittunik Avatinga: Avatingalluanga

The environment we want to sample is undisturbed natural Arctic peatland. We want to measure the effects of peatland carbon accumulation and extent with changing climate, particularly links between warming seen over the last ~150 years, and over the last 40 years. As such, it is important the environment is undisturbed.

Qanurittuq Ittunik Avatinga: Inuuhimayunut Avatinga

Qanurittuq Ittunik Avatinga: Inungit-maniliurutingit Avatinga

Miscellaneous Project Information

We have proposed to make a presentation of our work to residents of Pond Inlet, we are keen also to hear their first-hand experience of how the environment has changed over the last several decades. One hypothesis we have is that carbon accumulation in peat increases with warming, meaning Arctic peatlands could be an important future atmospheric carbon sink.

Naunaiyainiq ukuninnga Ayurhautingit unalu Piumayaat Ikikliyuumiutinahuarutit

The impact of our sampling is expected to be very very low in the natural environment. Our samples are approximately 8cm x 3cm x peat depth (with only one long core at each site, up to around 1m, most depth < 20cm). The holes left are small such that they can fill in and cover-over with vegetation quickly. We are careful not disturb local wildlife, and impact as little as possible the natural environment.

Tamatkiumayunik Ihuikgutivaktunik

Impacts

Ilitariyauniq Avatiliriniqmut Ayurhautingit

	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
Havakvinga																									
-		-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-		-	-	-	-	-
Aulapkaininnga																									
Sampling sites		-	-	-	-	-	-	-	-	-	-	-	-		M	-	-	-	-		-	P	-	-	-
Piiqtauniq																									
-		-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-		-	-	-	-	-

(P = Nakuuyuq, N = Nakuungittut unalu mikhilimaittuq, M = Nakuungittut unalu mikhittaaqtuq, U = Naluyauyuq)

Havaariyauyukhamut Nayugaa

List of Project Geometries

1	point	1 Pond Inlet west
2	point	2 Pond Inlet east
3	point	3 Pond Inlet south
4	point	4 Inlet coast
5	point	5 Glacial valley