



## ᓄᓇᓂᓯ ᐃᓚᑎᑦᑎᐱᐅᑦ ᑲᑎᓚᐱᐱᑦᑎᑦ ᐅᐱᓯᓄᐅᑦ ᓯᑭᓯᑭᓴᐱᐱᐅᐅ #125890

### Sampling treeline trees to develop a temperature reconstruction using quantitative wood anatomy

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New

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Scientific Research

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Period of operation:

from 2024-06-24 to 2024-08-24

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Adam Csank

Department of Geography, University of Nevada-Reno

1664 N Virginia St

Reno Nevada 89557

United States

ᐅᓴᑲᑦᐅᑦᑎᑦ: 7757846663, ᓴᑲᓴᐅᑦ:

כחלק מפרויקט

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**ᖃᓐᑎᓂᓐ:** The North American Arctic is one of the fastest warming regions in the world, and scientists expect temperatures to continue rising at more than twice the rate of the global average over the next 100 years. Greenhouse gases aren't the whole story, though. Past volcanic eruptions have caused periods of cooler temperatures in North America, so it is important to study both natural and human drivers of changes in the climate. However, the short length of temperature records in this area make it difficult to observe long-term variability in temperature or the impacts of volcanic eruptions in the distant past. This project aims to reconstruct records of past climate from the North American treeline by examining tree rings collected by obtaining tree cores from spruce trees in northern Alaska and Canada to understand and record detailed temperature variations over long time periods. Tree core samples will be studied using a method called "quantitative wood anatomy", where project scientists will take detailed measurements and use information about the thickness and shape of individual cell walls in the tree rings to tell a story of what the climate was like in the past. By conducting this research, scientists at the University of Arizona and the University of Nevada, Reno will be able to fill gaps in the current record of historical summer temperatures and identify the timing and strength of periods when volcanic eruptions contributed to periods of colder than normal summer temperatures. The findings of the research will then be used to contribute to a better overall understanding of what the climate was like in North America many, many years ago before we had weather stations. The project will involve collaboration with undergraduate and graduate students, and will involve discussions with teachers and the community in Kugluktuk, which will bring together a diverse group of voices interested in understanding the past climate in the North American Arctic. To carry out this project will require a team of 3-4 scientists to travel to a location at the northern edge of treeline on the banks of the Coppermine River. The team will use a local guide company to fly us to the nearest location to our proposed sampling site that can be accessed by float plane. We will then travel by raft along the Coppermine River until we get to the site. We will sample 30-40 trees using increment borers, a non-destructive technique that takes a small core sample from each living tree. Coring trees does not cause any lasting harm to living trees. We will also be collecting cross-sections from any dead wood that is present in the same area as the trees we sample. We aim to carry out this sampling during the summer of 2024.

▷Δ&∇D<: L'Arctique nord-américain est l'une des régions au monde qui se réchauffe le plus rapidement, et les scientifiques s'attendent à ce que les températures continuent d'augmenter à un rythme plus de deux fois supérieur à la moyenne mondiale au cours des 100 prochaines années. Mais les gaz à effet de serre ne représentent pas la seule chose qui s'influence les températures. Les éruptions volcaniques aux passées ont provoqué des périodes de températures dans l'été plus froid en Amérique du Nord. Il est donc important d'étudier les facteurs naturels et humains des changements climatiques. Cependant, la courte durée des enregistrements de température dans cette zone rend difficile l'observation de la variabilité à long terme de la température ou des impacts des éruptions volcaniques dans un passé lointain. Ce projet vise à reconstruire les enregistrements du climat passé de la limite forestière nord-américaine en examinant les cernes des arbres collectés en obtenant des carottes d'épinettes du nord de l'Alaska et du Canada afin de comprendre et d'enregistrer les variations détaillées de température sur de longues périodes. Des échantillons de carottes d'arbres seront étudiés à l'aide d'une méthode appelée « anatomie quantitative du bois », dans laquelle les scientifiques du projet prendront des mesures détaillées et utiliseront des informations sur l'épaisseur et la forme des parois cellulaires individuelles des cernes des arbres pour raconter l'histoire du climat de l'année. le passé. En menant cette recherche, des scientifiques de l'Université de l'Arizona et de l'Université du Nevada à Reno seront en mesure de combler les lacunes dans les enregistrements actuels des températures estivales historiques et d'identifier le moment et la force des périodes pendant lesquelles les éruptions volcaniques ont contribué à des périodes plus froides que la normale. températures estivales. Les résultats de la recherche seront ensuite utilisés pour contribuer à une meilleure compréhension globale du climat en Amérique du Nord il y a de très nombreuses années, avant que nous ayons des stations météorologiques. Le projet impliquera une collaboration avec des étudiants du premier cycle et des cycles supérieurs, ainsi que des discussions avec des enseignants et la communauté de Kugluktuk, qui rassembleront un groupe diversifié de voix intéressées à comprendre le climat passé de l'Arctique nord-américain.Pour mener à bien ce projet, une équipe de 3 à 4 scientifiques se rendra à un endroit situé à la limite nord de la limite forestière, sur les rives de la rivière Coppermine. L'équipe fera appel à une compagnie de guides locale pour nous amener à l'endroit le plus proche de notre site d'échantillonnage proposé, accessible par hydravion. Nous voyagerons ensuite en radeau le long de la rivière Coppermine jusqu'à arriver sur le site. Nous échantillonnerons 30 à 40 arbres à l'aide de foreurs progressifs, une technique non

Inuinnaqtun: Nunaqyuami Atluqtaqtuani atauhiq kayumiktumik unakpalianiqhaq nunani hilaqyuami, naunaiyaiyit nahuriyut unaqnigit uunakpalianiginik amigaitqiyaniq malruiqtunigani hilayuumi amigainiqhani atuqtukhani 1-hanani ukiuni. Halumaitut puyuvallit tamaitaugitut unipkaami, kiheani. Taimani nunap qaraqnigil iluanit qunmut pijutauyut niglaumaniganik Nunaqyuami, atuqniqatiaqtuq ilituqhariaqani tamaknik nunami inuulu pijutainik aalaguqniganik hilap. Kihiani, naitut unaqniganik/niglaumaniganik naunaipkutit uvani nunami ayuqhautauyut nalunaiyariagani hivituyumik taimainiginik unaqniginik/niglaumaniginik aktuniginikluniit nunap iluanit qagaqniginik taimaniraaluk. Una havaaq pijutaunahuaq nalaunahuariagani naunaipkutit taimani hilap qanuriniganik Nunaqyuami napaaqtuqaqniganik ilituqhaqlugit napaaqtut iluit kaivyariktuinit ahiyunit napaaqtunit ukiuqtaqtuani Alaska-mi Kanatamilu kagiqhiyaagani naunaiyaklugilu unaqniganik/niglaumaniganik qanuriniginik taimaniraaluk amihuni ukiuni. Napaaqtut iluinik naunaiyagakhat ilituqhaqtauniaqtut atuqlutik "amigaitunik qiyuknik iluinik", ukunani havaami naunaiyaiyit naunaiyaitiaqniaqtut uuktaqlutit atuqlugilu hivuniqhijutit hilikniginik qanuriniginiklu atuni kaimaluriqninuagit iluit napaaqtut unipkaaqaqmata hilap qanuriniganik taimaniraaluk ukiuni atuqhimayuni. Havaariniganik uuma ilituqhautip, naunaiyaiyit Ilihaqvikiyuamit Arizona-mi, Nevada-mi, Reno-milu iliurainiaqtut ilaguqaqnigni taya naunaipkutini taimani auyami hilap unaqniganik/niglaumaniganik nalunaiqlugilu hunautilugu hivituniginiklu nunap iluanit qaraqniginik qunmut pijutauyut niglaumatqiauniginik atuqtauvaktumit auyami unaqniganik/niglaumaniganik. Nalunaiqtauyut ilituqhautimi atuqtauniaqtut ilaliutilutik kagiqhivalirutikhanik tamaini qanuginiganik hilap Nunaqyuami taimaniraaluk ukiuni piqaliriaqtinata hilalikijutunik ila naunaiyautinik. Havaaq ilauviuniaqtuq havaqatiriikniginik ilihagpaaliqhimaagtut ilihagtaaqhimayulu ilihaghtunik, ilaqaqlunilu uqaqatiriikniginik ilihaiyit nunagiyauyuqlu Quqluqtumi, katijutauniaqtuq aalatqiinit ikayuqtiriinit nipainik ihumagiyaqaqtunik kagiqhivaaliriagani taimani hilagiyauyuq Nunaqyuami Ukiuqtaqtumi. Havaariyaagani una ikayuqtiriigutauniaqtuq pigahunit hitamaniluniit naunaiyaiyiniq aulaariagani inikhamut ukiuqtaqtumi napaaqtuqaqniganut hinaani Quqluqtuup Kuugani. Ikayuqtiriit atuqniaqtut nunagiyaayumit tikuaqtuiyukhamik havakviuyumik tikmiakut akyaqtauyaaptikni qaniniqhamut atulirumayaptiknik naunaiyaivikhamik tikitaulaqaqtumik tikmiakut qayalikmik. Aulaqniaqtuqut tilrautaqtukut Quqluqtuup Kuugavut tikilvikhaptiknut

inikhami. Naunaiyainiaqtugut 30-nit 40-nut napaaqtunik atuqluta ikuutaqnik, hugautaugituq ahivaijut mikiyumik kaimaluriktunik nalrulumik ilituraqtakhamik atuni nauhimaaqtumit napaaqtumit. Iluit ahivaqtiriagani napaaqtut ihuulujutaugituq nauhimaaqtuni napaaqtuni. Katitiriniaqtugulu ilaginik ukunanga tuqugayunit napaaqtunit talvaniitunik nunami atautimi ilagilugit napaaqtut ilituqhaqtaptikni. Havaariyumayaqut una atuliqat auyaknigani ukiup 2024-mi.

**Personnel**

Personnel on site: 5

Days on site: 10

Total Person days: 50

Operations Phase: from 2024-06-24 to 2024-08-24

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$\subset \Delta^{\text{eq}}_j \wedge J_{\alpha} \models \dot{n} \triangleleft r^{\text{eq}} \subset P_L \dot{r}$

### Project transportation types

### Project accomodation types

## Temporary Camp



$\triangle^b \subset \mathcal{J}^c$ 
$$\Delta^b C d \Gamma n \sigma \Delta^c \sigma^c$$

<b>ᐱᑕᓚᐱᓴᔨᔭᒪᒻᑦ ᐱᑕᓚᐱᓴᔨᔭᔭᐱᑦᑐᑦ</b>	<b>ᑭᓄᐱᑦᑐᑦ ᐱᑕᑦᑯᑦ</b>	<b>ᑭᓄᓂᓯᑦ ᐱᑕᑦᑯᑦ ᖃᑭᐱᑦᐱᑦᑐᓚᔨᔭᔭᑦ</b>	<b>ᑭᓄᑦ ᐱᑕᑦᑕᐱᑦᐱᑦᑐᑦ</b>	<b>ᖃᓴᒪᑦᖃᔨᓂᖃᑦᑭᑦᐱᑦᑐᑦ</b>
Camp	ᑭᓄᑕᑕᓚᑦᑐᑦ	5 lbs per day	Will bring biodegradable human waste bags that will be packed out at the end of our project.	Biodegradable human waste bags.

**◀◁▷▶C<sup>a</sup>C<sup>b</sup> ◀<sup>b</sup>C<sup>a</sup>▷▶L<sup>c</sup>**

The impacts of our expedition will be what might normally be expected from a small group of people camping along the river. We will be a camp of 3-5 people who will pack in and pack out all waste and leave a minimal footprint. Our scientific sampling methods are non-destructive. We take increment cores (small samples drilled out of a tree) that leave no lasting damage to the trees. We will only cut samples from dead wood and driftwood from around the site.



# **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**

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**Miscellaneous Project Information**

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We plan a low impact expedition to sample trees at treeline. We will be a camp of 3-5 people who will pack in and pack out all waste and leave a minimal footprint. Our scientific sampling methods are non-destructive. We take increment cores (small samples drilled out of a tree) that leave no lasting damage to the trees. We will only cut samples from dead wood and driftwood from around the site.

**Cumulative Effects**

## Impacts

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1 polygon	We will be sampling sites along the Coppermine River that were previously sampled in the 1980s. These are forested sites right at treeline.
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