Mackenzie Mountains Earthscope Project

Landowner Fact Sheet

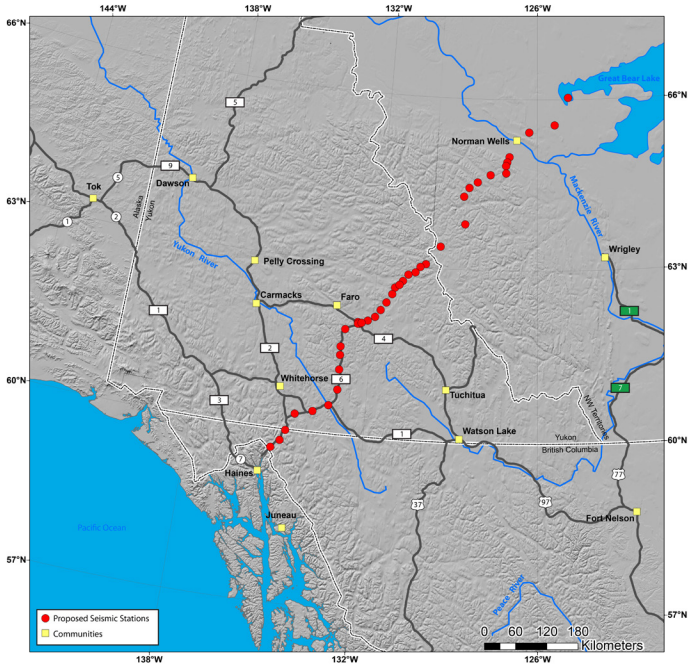
What is the project?

We are a group of American and Canadian researchers who have received a grant to research the formation and present geological processes of the Mackenzie Mountains that includes a 2015-2018 field research program. Three universities, Colorado State University, the University of Alaska Fairbanks, and Yukon College will undertake the project.

The Mackenzie Mountains Earthscope project (MMEP) is funded under EarthScope, a program of the U.S. National Science Foundation. Our project is collaborating with the larger EarthScope USArray project, which will be studying the broader northwestern Canadian and Alaskan regions, and with Canadian researchers from several agencies including the Yukon Geological Survey, NWT Geoscience Office, Geological Survey of Canada, Arctic Institute of North America, the University of Ottawa and others.

The project will increase understanding of the major geologic forces and processes that uplifted these spectacular mountains, and that continue to influence them today. MMEP will deploy sensitive GPS and seismographic instrumentation to understand how the mountains are changing today and to image the structure of the deep Earth (down to many hundreds of kilometers below the surface).

Insight from these investigations will provide better understanding of past and present-day geologic processes responsible for valleys, plateaus, mountains, volcanoes, earthquakes, and other features in this remarkable part of Canada.



Red markers show potential seismometer locations, with final locations determined upon consultations with landowners, local residents, and government and First Nations authorities. Yellow boxes show the communities around the study area.

The project aim is strictly to understand the uplift of the mountains, and will not generate data suitable for oil and gas exploration, nor are we partnered with any resource extraction industries. We will not be using any explosives or other active means to explore the earth; rather we will record the energy of both local and distant earthquakes and measure ground motions to understand the geologic processes creating the Mackenzie Mountains.

We expect to begin initial recording around 2015, and to have all equipment removed by 2018.

Warner College of Natural Resources
Colorado State University

UAF University of Alaska Fairbanks

YukonCollege

How does MMEP Work?

The project goal is to deploy 40 temporary seismographs and three GPS instruments in a rough line that spans about 1000 km between Skagway, Alaska across the Mackenzie Mountains, to the edge of Great Bear Lake. We will also make temporary (a few days) GPS surveys of about 25 survey benchmarks, mostly located along the road system in Yukon Territory. These instruments, combined with others deployed in the region, will provide a better understanding of earthquakes in the area as well as an improved understanding of the geology of the Mackenzie Mountains extending hundreds of kilometers into the Earth.

Example of a seismograph deployed in Colorado, USA. Our sites may be slightly different from the one pictured but will be similar in size.

Cultural and Land Impacts

Our team will consist of 7-8 students and researchers that will travel to Yukon Territory and Northwest Territories in the summers of 2015-2018 to perform reconnaissance work; meet with First Nations, local communities, landowners and other interested parties; give outreach presentations; and deploy and maintain the instruments.

To meet the project goals, about 27 seismometers will be deployed near and along the Canol Road in the Yukon Territory and about 13 seismometers and three GPS instruments will be deployed in the Northwest Territories, via bush plane visits.

Our initial goal is to work with local landowners and interested parties to identify potential sites for the instruments. Deployment of seismometers has minimal impact on the land. We propose to dig a 1-meter deep hole into which we will place the seismometer and a temporary retaining structure. A data recorder and batteries (which may also be buried) along with solar panels will be placed in proximity to the instrument. To protect the site from animals a fence or other protection will be installed where warranted. No trees will be cut to install the equipment or access the instrument sites.

We hope to deploy 5 sites near Whitehorse in the summer of 2015, and the rest in 2016. Then in 2017, or perhaps sooner, we will visit these to download data and make any necessary repairs.

The GPS instrument deployment will consist of a 1-1.5-meter mast mounted on bedrock or other stable ground, on which to mount the GPS antenna. The GPS receiver and batteries will be placed in a box, and the instrument will be powered by solar panels. If landowners agree, we will leave the mast in place for possible future measurements, but remove all other equipment. If landowners want the mast removed, we would request that a small survey marker be placed in rock adjacent to it so that the precise position can be recovered in the future.

The field portion of the project will be completed by the summer of 2018, at which point all instrumentation will be removed and the sites remediated.

Although we hope that the interest of any local landowner or land manager in this project might enhance security and reporting of any obvious physical problems with the recorders, project staff will take ultimate responsibility for the safety of all instrumentation. If the equipment should be damaged or stolen during the experiment, there is absolutely no liability to the landowner. Upon completion of the MMEP staff will remove the equipment. If you would like to have your essential contribution to this historic scientific project noted in publications and elsewhere, please let us know.

Permitting

For the NWT part of the deployment, we are applying for a scientific permit through the POLAR licensing system for researchers in the Northwest Territories. The NWT's Aurora Research Institute (ARI) will facilitate this permitting. For the YT part of the deployment we are about to apply for a Scientists and Explorers License through the Heritage Resources Unit within the Yukon government. However, before doing so we wanted to give you advance notice and also inquire whether there are any permit or other applications or information you require in addition to the above permitting process.

We would be glad to explain any components or goals of our proposed project further, and would welcome any input or advice on our project and ways to improve what we are doing. Project leaders will be in Whitehorse, Yellowknife, and Norman Wells this summer, and we hope to visit any landowners or stakeholders, and can arrange travel to other communities if needed.

Contacts:

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Thank you!

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