# *Mackenzie Mountains Earthscope Project*

## *Landowner and Land Manager Fact Sheet*

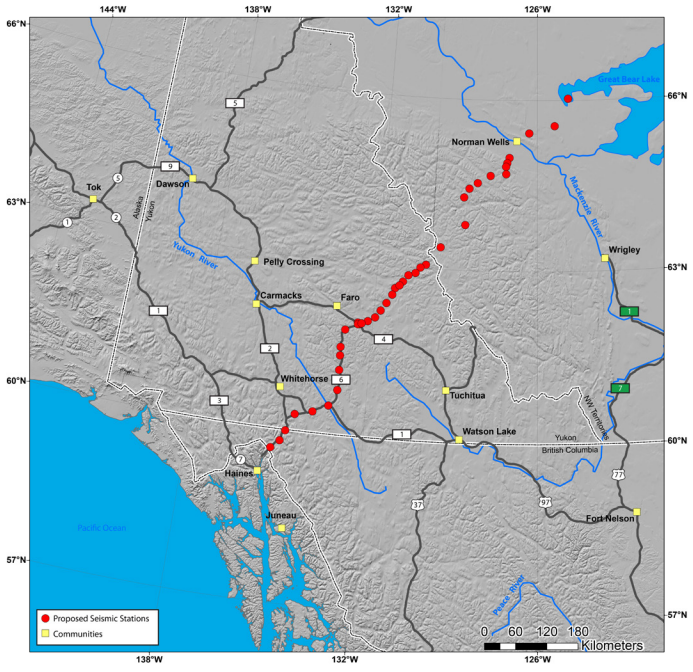
## What is the project?

The Mackenzie Mountains EarthScope Project (MMEP) is a scientific program funded by the U.S. National Science Foundation's EarthScope program (earthscope.org) and carried out by Colorado State University, the University of Alaska, Yukon College, and other partners to study the deep Earth under the Mackenzie Mountains region of NW and Yukon Territories.

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. Because of the very large scale of this scientific study, the project does not have relevance to local mineral or other natural resources interests.

We expect to begin recording around 2016, and to have all equipment removed by 2018.




*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.*

## How does MMEP work?

The project will consist of about 40 sensitive earthquake recorders (seismographs) deployed with an average spacing of more than 20 km along a nearly 1000 km long line for about 2-3 years, as well as fine-scale GPS observations made over five years at fewer locations.

These seismographs passively record faint ground motion from naturally occurring earthquakes in the region and around the world; the experiment does not involve explosions, vibrator trucks, or any other artificial sources of seismic energy. As

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earthquake signals travel through the earth, they are sped up, delayed, and otherwise altered by the Earth's geologic structure. Analysis of these effects enables us to recognize hotter and colder regions and other features underneath the recorders down to depths of hundreds of km (about 1/10 of the way to the center of the Earth) using a procedure that is similar to a medical CAT scan on a huge scale. Precise GPS measurements allow us to measure movements of the Earth as small as a few millimeters. This will allow us to determine whether the mountains are growing today and how they relate to active geological structures nearby. Putting all of the project data together will allow us to link the past deformation and geological structure with the present activity and broad-scale earthquake hazards, and will allow us to test hypotheses for the formation of these structures.

## What's an earthquake recorder?

The project will consist of about 40 sensitive earthquake recorders (seismographs) deployed with an average spacing of more than 20 km along a nearly 1000 km long line for about 2-3 years, as well as fine-scale GPS observations made over five years at fewer locations.

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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.

## Contacts:

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# Thank you!

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