Permafrost Hazard Mapping

Facilitating the application and further development of techniques and methods to monitor and predict the effects of permafrost subsidence and upheaval as a tool for climate change adaptation planning.

CONTEXT

Rapid warming in the Northwest Territories is resulting in the degradation and thawing of permafrost. Understand past changes and the current status of permafrost throughout the NWT will support climate change adaptation and decision making with regards to permafrost. The approaches and methodologies that have been successfully demonstrated by other recent projects will be applied to this project. Using multi temporal RADAR and complimentary (in situ) data sources to measure vertical and horizontal surficial displacement in particular, will be used to understand the level of impact that climate change is having on permafrost.

Source: Government of the Northwest Territories

OBJECTIVE

The objective of this project is to monitor and predict the effects of permafrost subsidence and upheaval using satellite mapping known as DInSAR (Differential Interferometric Synthetic Aperture Radar) and remote predictive mapping techniques and to provide better informed decisions in the selection of sites for future development. The project has two complimentary goals: to produce community permafrost subsidence hazard maps to support climate change adaptation and decision making; and to develop a governance document outlining best practices for DInSAR permafrost hazard mapping.

APPROACH

The Government of the Northwest Territories (GNWT) Department of Environment and Natural Resources (ENR) contracted a third party to supply RADARSAT-2 imagery. The project has benefited from an agreement between the Government of Canada and MacDonald Dettwiler and Associates with free RADARSAT-2 imagery.

EXPECTED RESULTS

Results so far include:

1. Working with 3V Geomatics to acquire relevant data and imagery – RADARSAT-2, and processing.
2. Processing RADARSAT-2 C-Band SLC temporal image stacks.
3. Presentations on the project were held with GNWT transportation and the NWT Associate of Communities.

Significance

Creating an inventory of permafrost maps in the NWT will allow a better understanding of areas being impacted by permafrost thaw, allowing increased adaptation resource efficiency, community planning and the filling of research gaps.

Partners

- *Aboriginal Affairs and Northern Development Canada (AANDC)*
- *TRACS : Transportation Risk in the Arctic to Climatic Sensitivity*
- *CCAPT: Climate Change Adaptation for Permafrost Terrain.*

FOR MORE INFO

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