

Geophysical Research Abstracts,
Vol. 10, EGU2008-A-07499, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-07499
EGU General Assembly 2008
© Author(s) 2008



Permafrost-related Hazards and Community Development, Gjoa Haven, Nunavut, Canada

S. Papadimitriou, N. Catto

Department of Geography, Memorial University of Newfoundland, St. John's, NL, A1B3X9, Canada (ncatto@mun.ca / Fax: +709-737-3119 / Phone: +709-737-8413)

Gjoa Haven, currently home to 1200 people, lies in the continuous permafrost zone of the Canadian Arctic. It is thus a locale subjected to the hazards of permafrost warming and ablation, particularly in the context of climate change and variation. Permafrost thaw can result in subsiding terrain and ground-ice slumps, and consequently can pose a considerable risk to existing community infrastructure. Analyses of aerial photographs and field surveys have indicated that substantial permafrost ablation has occurred in Gjoa Haven since 1960. When coupled with the rapid population growth of the community through that period, resulting both from natural increase and resettlement, permafrost ablation poses a series of hazards, risks, and challenges.

The sensitivity of the terrain in Gjoa Haven and the surrounding area to permafrost ablation was assessed, in order to provide recommendations for areas of terrain suitable for new development. The sensitivity analysis performed included analysis and mapping of the Quaternary sediments in Gjoa Haven and the surrounding region. Hazards identified in the community include gullying and erosion, thaw slumping, sewage lagoon breaching, and exposure of fuel pipelines.

The community of Gjoa Haven is potentially able to adapt to and cope with changes associated with the shifting arctic climate. Much of the existing infrastructure in the community is built on coarse-grained materials associated with marine terraces and strandlines that are not ice rich and thus are not susceptible to the damaging consequences of permafrost thaw. Areas of fine sands and silts, however, are failing, and must be avoided as development continues.

Ongoing research entails using the completed terrain mapping together with sensitivity analysis to identify adaptation needs, and to improve community adaptive capacity. The data can be used to evaluate past and current management strategies employed to manage risks, in order to determine if the community is equipped to cope adequately with the physical results of climate change. This analysis is vital to efforts in building resilience in light of ongoing environmental change, both physical and socioeconomic, in Gjoa Haven.