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Project profile #1 - September 2010

Instability of coastal landscapes in Arctic communities and regions

Summary

Seasonal changes in the northern landscape, together with extreme weather events, can create instability and hazards, including flooding, landslides, thaw failure and subsidence, coastal ice push, storm surges, and coastal erosion. Our project team is measuring both the drivers of change and the effects of instability in community landscapes at selected sites across the Arctic.



Coastal erosion in Arctic Bay

The study sites are chosen in part through consultation with Northern communities and partners and represent key sites for assessing coastal land-system vulnerability across a range of hazard exposures and system sensitivities.

Future climate scenarios and impacts modeling predict changes in climate variables that may increase coastal landscape instability and hazard risk.



Community meeting in Clyde River

Projecting the future response of the coastal land system to these changes forms another key objective of this *ArcticNet* project. Our goals are to produce predictions of the rate and degree of change to key environmental indicators expected under different climate change scenarios and to assess the vulnerabilities of coastal landscapes and community resources and infrastructure to such changes.

Together with northern communities and partners we plan to integrate local and external research and knowledge on climate change trends and impacts in order to provide a common basis for decision-making at all levels, thereby enhancing community adaptive capacity. Ultimately the goal is to promote informed choices of adaptation measures and enhanced resilience in northern coastal communities.

Study site locations



Arctic Bay, Arviat, Cambridge Bay,
Clyde River, Hall Beach, Iqaluit,
Kugluktuk, Pond Inlet, Resolute,
Whale Cove.

Local collaborations

Examples include the Qikiqtaruk Territorial Park at Herschel Island YT, the Clyde River Community Research Committee (Ittaq and Ilisaqsvik Society), community decision-makers (elders, hunters and trappers, community councils) from Tuktoyaktuk to Gjoa Haven to Salluit to Nain and regional organizations and governments (e.g. Inuvialuit Joint Secretariat and Game Council, Nunavik Government, Nunatsiavut Government).

Questions to Researchers

ArcticNet recognizes the importance of framing climate change issues from various perspectives. Below we are asking a few questions to the project leaders in order to identify scientific priority issues and demonstrate how the research results can be used by policy and decision-makers in terms of community and climate change adaptation planning in the Eastern Canadian Arctic.

1) From your own research perspective can you identify and describe the key issues that are (will be?) affecting social, economic or environmental conditions in the Eastern Canadian Arctic?

From our perspective of Arctic coastal zones, the priority science issues revolve around: 1) measurement and modelling of sea level change across the Canadian Arctic; 2) assessing the trade-off between reduced sea ice duration and increased storm activity and wave energy on coastal stability; 3) predicting the effects of thawing permafrost on the integrity of community infrastructure and coastal resources; 4) identification and mapping of coastal hazards, both above and below sea level, that may impact or constrain coastal activities; and 5) assessing the sensitivity and biodiversity of marine benthic habitats under changing oceanographic and terrestrial conditions.

2) How will your ArcticNet project contribute to a better understanding of these issues affecting the Eastern Canadian Arctic?

Our project will generate the relevant scientific information to address the following goals:

- To generate maps of landscape hazard risk for integration with local and regional planning processes
- To assess future vulnerability of communities to landscape changes for adaptation planning

- To map the seabed off communities for navigation, hazard assessment and habitat classification
- To generate projections of expected sea-level changes at specified coastal locations throughout the Arctic
- To measure and model coastal erosion and its effects on communities and sensitive locations
- To measure permafrost adjustments to changing climate and model associated ground surface responses.

3) Provide an example of how the results of your project may contribute to the decision-making process with respect to these issues.

For example, the results of our field program have directly informed community climate change adaptation planning in Clyde River, Arviat and several other Nunavut communities. Our scientific information on landscape instability has identified constraints on the future development of community lands and potential threats to existing infrastructure. In another example our team has produced marine benthic habitat maps for waters adjacent to communities and assessed the sensitivity of critical habitats to climate and community landscape change.

General information

Contact us if you have suggestions, feedback or questions regarding the research projects presented in this newsletter.

Project contact information

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Upcoming Newsletter

Researcher

Frederic Lasserre

Research project

Climate change and commercial shipping development in the Arctic

