

- ArcticNet project profile (2008-11)
- Scientific priority issues

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Sea Ice of the Arctic

Summary

The observed decline in the summer sea ice, in terms of both magnitude and trend, is alarming. We are changing the arctic from one that has been dominated by multiyear sea ice to one that will now be dominated by first-year sea-ice related processes. We can expect a seasonally ice free arctic early in this century. It is important to note that our planet has not had a seasonally ice-free Arctic for at least the past 1.1 million years.



Summer field trip activities

Both flora and fauna have evolved over millions of years to take advantage of the presence and timing of the seasonal sea ice life cycle. Now, northern peoples increasingly are finding their traditional way of life under pressure from these changes as they struggle to adapt.



Winter field trip activities

The next few decades will proceed with significant challenges for the Arctic. Marine ecosystems will come under increasing pressure; industrial activity will increase as more exploration and development occurs; and the Inuit people will increasingly find it a challenge to use sea ice for cultural and subsistence purposes.

This project brings together key sea ice researchers to examine the processes that cause the observed changes in sea ice dynamic and thermodynamic processes, snow cover, and physical coupling across the ocean-sea ice-atmosphere (OSA) interface. We will provide sea ice expertise to the coordinated ArcticNet IRISs of the coastal Canadian Arctic, supplying the required information for sound management of these challenges.

Study site locations



Cambridge Bay, Resolute, Grise Fjord, Pond Inlet, Arviat, Rankin Inlet, Iqaluit, Sanikiluaq

Local collaborations

Our project collaborates with various Northern groups including the Inuvialuit Joint Secretariat, Inuvialuit Game Council, Wildlife Management Advisory Committee, Environmental Impact Screening Committee, Hunters and Trappers Committees in Sachs Harbour, Ulukhaktuk, Paulatuk, Sanikiluaq, Churchill Northern Studies Centre, NTK (Nunavut Hudson Bay Inter-Agency Working Group), and the Port of Churchill.

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?

The seasonal reduction of Arctic sea ice is a key issue that is likely to affect social, economic and environmental conditions in the North. Sea ice serves many important roles in the Arctic. On a global scale, it's high reflectivity (known as albedo) reflects much of the solar energy that enters the North. Without the ice layer, the solar energy is absorbed by the sea water, further warming the ocean water temperature and melting sea ice. This can affect species distribution and local climate. This can also have a significant effect on energy transfer between the sea water and the atmosphere. Sea ice plays a very important ecological role, affecting both biological and physical aspects of the ecosystem including ocean currents, nutrients, gas exchange, and marine mammal habitat.

The loss and thinning of the Arctic sea ice will likely have numerous economic repercussions including increased access to natural resources such as oil, gas and minerals. International shipping in the North may also increase as ice extent and thickness become reduced.

Locally, sea ice is important to Northerners who use it on a regular basis for transportation and hunting. The ice has become less predictable than in the past, which has made the traditional activities more challenging, and at times less safe.

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

Our project is working to better understand the extent of sea ice loss through the use of satellite imagery, and the effect this loss will have on the physical marine environment. Satellites tell researchers about sea ice extent, type, and movement, and provide a means to access regular data from large areas. We also study the physical properties at the snow/sea ice surface that affect thermodynamic and radiative transfer processes. The Sea Ice project also provides sea ice expertise to other ArcticNet projects.

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

Accurate information about sea ice extent, type, trends and location will be crucial to anticipate other changes to the marine environment, as well as the potential for future transportation and resource access. As sea ice shifts from being dominated by multi-year ice to being dominated by first year ice, this will affect access to resources, extraction and transportation. Data from this project will be helpful to ensure policy-makers make the most sound decision.

As an invited speaker, Dr. Barber recently presented results from this project to Parliamentarians in Ottawa, providing a direct example of contributing to decision-making through policy-makers.

General information

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

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Upcoming Newsletter

Researcher

Philippe Archambault

Research project

Impact of climate change on the life of the Arctic Ocean floor

