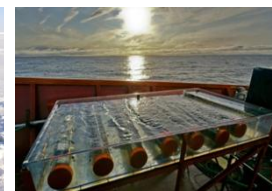


- *ArcticNet project profile (2008-11)*
- *Scientific priority issues*

**Jean-Eric Tremblay, Michel Gosselin**



*Jean-Eric is a professor at Université Laval; Michel is a professor at Université du Québec à Rimouski, Institut des sciences de la mer.*



Shelly Carpenter &amp; Martin Fortier/ArcticNet

## Project profile #14 – April 2011

## Impacts of climate change for the marine Arctic

## Summary

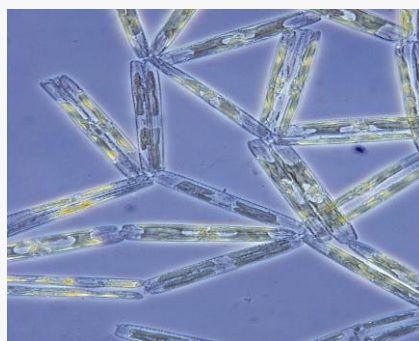
Some implications of climate change for the marine Arctic ecosystem are fairly intuitive. For instance, polar bears and ringed seals are bound to be negatively impacted by the loss of ice that provides the physical platform for their hunting and reproduction. Other consequences are less obvious.



Benedikt Guomundsson/ArcticNet

## Polar bears on pack-ice

The micro-algae that grow in the brine channels of ice and in surface waters are the ultimate source of food for the marine food web, much like grass sustains cattle on land. Will the production of these microscopic plants increase or decrease and will the transfer of this production toward harvestable resources become more or less efficient?

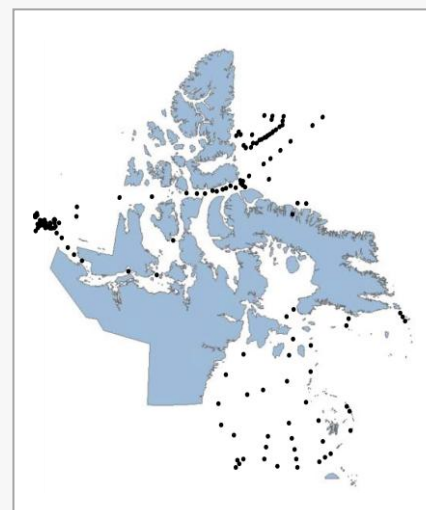


### Ice algae (*Nitzschia frigida*)

How will the biomass, distribution and species dominance of microalgae, zooplankton and fish change? Is the capacity of the Arctic Ocean to absorb the greenhouse gas CO<sub>2</sub> decreasing or increasing?

We will seek answers to these questions by looking at how changes in the physical environment (e.g. loss of sea-ice, increasing temperature, enhanced episodic mixing of the water column by storms during spring and autumn, increased penetration of Atlantic waters) affect the productivity and species dominance of organisms in the lower part of the food web. Changes in the lower food web are bound to affect the nutrition and spatial distribution of higher trophic level organisms such as seals, whales, and polar bears.

## Study site locations



*Amundsen Gulf, Viscount Melville Sound, Barrow Strait, Lancaster Sound, North Water Polynya, Baffin Bay, Gibbs Fjord, Hudson Strait, Hudson Bay.*

## Local collaborations

Our collaborations with northern communities are limited to having a Wildlife Monitor on board since our field work mainly takes place on the CCGS Amundsen.

## 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?**

Living marine resources play a crucial role in the culture, nutrition and economy of Northern communities and will likely be affected by climate changes. It is essential to provide key information on the likely alteration of marine productivity and changes in the location and availability of harvestable resources. From our perspective of Arctic biological hotspots, the key issues revolve around:

1) Investigating, comparing and contrasting the present physical and biological structure and productivity of different hotspots to better understand their ecological function and susceptibility to climate change;

2) To monitor changes in the number, total area and biological yield of hotspots by means of remote sensing.

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

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

- Provide key information on the “present” functioning of the marine ecosystem before it becomes radically altered.

- Monitor changes in continuity with the work done during ArcticNet phase I (2004-08) to obtain a 6-year long time series by the end of phase II (2008-11).

- Obtain parameters to validate and implement numerical ecosystem models of the lower-food web and attempt to forecast future changes.

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

Some of the hotspots we are working on were identified by Park Canada as candidates for the establishment of National Marine Conservation Areas (NMCA). The information provided by our research into the ecological structure and function of these waters is a necessary step toward the formal designation of a NMCA. Once designated, the protected status of NMCA's will insure their usefulness as monitoring sites for future Regional Impact Assessments and model validation.

## General information

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

## Project contact information:

### Jean-Eric Tremblay

Professor  
Université Laval  
Québec, QC  
[jean-eric.tremblay@bio.ulaval.ca](mailto:jean-eric.tremblay@bio.ulaval.ca)

### Michel Gosselin

Professor  
Université du Québec à Rimouski  
Institut des sciences de la mer  
Rimouski, QC  
[michel\\_gosselin@uqar.qc.ca](mailto:michel_gosselin@uqar.qc.ca)

## ArcticNet IRIS-2 contact

### Philippe LeBlanc

ArcticNet IRIS Coordinator  
Eastern Arctic Region  
Memorial University of Newfoundland  
[pleblanc@mun.ca](mailto:pleblanc@mun.ca)

Visit our website at:

[www.arcticnet.ulaval.ca/research/iris\\_2\\_info.php](http://www.arcticnet.ulaval.ca/research/iris_2_info.php)

## Upcoming Newsletter

### Researcher

**Barry Smith**

### Research project

Community adaptation in a changing Arctic

