

# Long-Term Observatories in Canadian Arctic Waters

## Summary

### Project Leader(s)

Gratton, Yves

The Arctic is rapidly changing! Preliminary observations show that the Arctic ice cover was 20% smaller in September 2007 than in 2005, the year with the smallest ice cover on record. The ice cover is the insulation between the atmosphere and the ocean. A shrinking ice cover means that more light and more heat are going to penetrate in the Arctic Ocean and totally change the Arctic environment. The objective of this project is to monitor these changes in physical, biological and geochemical properties of the Canadian Arctic waters. We plan to deploy twelve ocean observatories in Hudson bay, Baffin Bay, Beaufort Sea and the Eastern Arctic Ocean. These observatories are the oceanic equivalent of atmospheric meteorological stations. They will be deployed and recuperated one year later. While in the water, they will record temperature, salinity, velocity, dissolved oxygen, nutrients, light intensity, fluorescence (an indicator of micro-algae biomass) and ice motion. Hydrophones will also record the vocalization of whales and other marine mammals. The data will be used to describe the seasonal and annual variations in the Arctic environment and its local ecosystems. This will, in turn, enable us to understand how global warming is affecting the Arctic and how fast.

## People

### Network Investigators

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## Partners

Canadian Foundation for Innovation

Fisheries and Oceans Canada - Maurice Lamontagne Institute

Imperial Oil Resources Ventures Limited

Institut des sciences de la mer de Rimouski

IPY Federal Program Office

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## Publications

### Articles Published in Refereed Publications

Barber, D. G., Asplin, M.G., Gratton, Y., Lukovich, J.V., Galley, R.J., Raddatz, R.L., Leitch, D., 2010, The International Polar Year (IPY) Circumpolar Flaw Lead (CFL) System Study: Overview and the Physical System, *Atmosphere-Ocean*, v48, no4, 225-243, Published

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Makabe R, H Hattori, M Sampei, Y Ota, M Fukuchi, L Fortier, H Sasaki, 2009, Regional and seasonal variability of zooplankton collected using sediment traps in the southeastern Beaufort Sea, Canadian Arctic, Polar Biology doi: 10.1007/s00300-009-0701-7., 1, Accepted

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Sampei, M., Sasaki, H., Hattori, H., Forest, A., Fortier, L., 2009, Significant contribution of passively sinking copepods to the downward export flux in Arctic waters, *Limnology and Oceanography*, 54(6), 1894-1900, Published

Simard, Y. and Fortier, L., 2008, Listening at climate change in ice-covered seas: example with AURAL autonomous hydrophones in the Arctic., *Proc. IEEE Oceans'08. MTS/IEEE - Quebec*, 1-2, Published

Vancoppenolle, M., Goosse, H. de Montety, A., Fichefet, T., Tremblay, B. and Tison, J-L., 2010, Modeling brine and nutrient dynamics in Antarctic sea ice: The case of dissolved silica, *Journal of Geophysical Research*, Accepted

### **Other Refereed Contributions**

Handegard, N.O., Demer, D.A., Kloser, R., Lehodey, P., Maury, O., and Simard, Y. 2009., 2010, Toward a global ocean ecosystem Mid-trophic Automatic Acoustic Sampler (MAAS)., Community white paper. *OceanObs'09 Venice, Italy*. <https://abstracts.congrex.com/scripts/jmevent/abstracts/FCXNL-09A02a-1739018-1-cwp09A02a.pdf>, 1-8, Published

### **Non-Refereed Contributions**

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Dumont, D., Martin, J. and Tremblay, J.E., 2008, Modelling the subsurface chlorophyll maximum in the Amundsen Gulf, 2008 Arctic Change Conference Proceedings, 208, Published

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Lansard, B., Mucci, A., Miller, L., Macdonald, R.W., and Gratton, Y., 2008, Winter variability of carbonate system parameters in the water column of Franklin Bay, 2008 Arctic Change Conference Proceedings, 253, Published

Mundy, C.J., Gosselin, M., Rossnagel, A., Barber, D., Martin, J., Tremblay, J.E., Gratton, Y., Darnis, G., Fortier, L., Palmer, M. and Arrigo, K., 2008, Dynamics of under-ice phytoplankton blooms observed in two adjacent coastal Arctic bays, 2008 Arctic Change Conference Proceedings, 273, Published

Roy-Gobeil, A., Y. Gratton, C. Brouard, C.J. Mundy, and L. Prieur, 2009, Ice edge upwelling during CFL, CFL 2009 meeting, 1, Published

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Sibert, V., Zakardjian, B., Gosselin, M., Starr, M. and Senneville, S., 2008, Understanding the spatial and temporal variability of primary production over the Hudson Bay, Foxe Basin and Hudson Strait marine system via coupled bio-physical models, 2008 Arctic Change Conference Proceedings, 150, Published

Sibert, V., Zakardjian, B., Saucier, F., Gosselin, M., Starr, M. and Senneville, S., 2009, Understanding the spatio-temporal variability of primary production over an Arctic/Sub-Arctic marine ecosystem (the Hudson Bay) via coupled bio-physical models, ASLO Aquatic Science Meeting 2009 Conference Proceedings, 1, Published

Simard, Y., 2009, Applications of active and passive acoustics to marine mammal ecosystem understanding, 43rd Congress of the Canadian Meteorological and Oceanographic Society, 1, Published