

1.3 Contaminant Cycling in the Coastal Environment

Summary

Project Leader(s)

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The overriding question Project 1.3 (Contaminants) hopes to answer is how climate variability in physical forcing and the biogeochemical response to this primary forcing will affect organohalogen and trace metal contaminant cycling at strategic locations across an east-west section of the high Arctic. Ultimately, we propose to relate changes in delivery and biogeochemical cycling of these contaminants to their levels in fish, marine mammals and the people who consume these tissues as part of their traditional diets. Mercury, a high priority northern contaminant, is potentially also an ideal "climate" tracer and will therefore be the object of detailed investigation.

People

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Partners

Natural Sciences and Engineering Research Council
Natural Resources Canada - Polar Continental Shelf Project
IPY Federal Program Office
Environment Canada - Northern Ecosystem Initiative
Alfred Wegener Institute Foundation for Polar and Marine Research
University of Manitoba
Natural Resources Canada - Geological Survey of Canada
Fonds québécois de recherche sur la nature et les technologies
Indian and Northern Affairs Canada - Northern Scientific Training Program
A.D. Latornell Endowment Fund
McGill University
Fisheries Joint Management Committee (FJMC)
Fisheries and Oceans Canada - Science Sector
Fisheries and Oceans Canada - Maurice Lamontagne Institute
Devon Canada Incorporated
World Wildlife Fund Canada
Fisheries and Oceans Canada - Freshwater Institute
Indian and Northern Affairs Canada - Northern Contaminants Program
Fisheries and Oceans Canada - Institute of Ocean Sciences
Natural Resources Canada - Earth Sciences Sector

Publications

Articles Published in Refereed Publications

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Non-Refereed Contributions

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Turner, J.D., Pollard, W.H., and Hoque, M.A. , 2004, Modeling of thermo-mechanical niche formation and block failure on Herschel Island, Yukon Territory, Canada, AGU-CGU Joint Assembly, 17-21 May, Montreal, Canada, 1, Accepted

Lantuit, H., and Pollard, W.H. , 2004, A volumetric analysis of long-term coastal erosion on Herschel Island, Yukon Territory : First results, 1st EGU (European Geosciences Union) General Assembly, 25-30 April, Nice, France, 1, Accepted

Pollard, W.H., 2004, Modeling Block Failure in Vertical Cliffs of Arctic Coasts Underlain by Permafrost, AGU Fall Meeting, 13-17 December, San Francisco, U.S.A., 1, Accepted

Robie W. MacDonald, Gary A. Stern , 2005, There's something polar about mercury but is it the atmosphere or the ocean?, Canadian Meteorological and Oceanographic Society , 1, Accepted

G.A. Stern, R.W. Macdonald, F. Wang, D. Leitch, 2005, Biogeographic provinces of Hg in the Beaufort and Chukchi Seas: Results from the SHEBA drift, ASLO summer meeting, Santiago de Compostela, Spain, June 19-24, 2005, Accepted

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Hansen-Craik, K., Hoyt, A., Bill, K., MacHutchon, A., Ferguson, S., Stern, G. and Loseto, L., 2005, Mercury levels in water and zooplankton in the western Beaufort and Chukchi Sea, a Beaufort Beluga Travel Corridor, 2005 ArcticNet Annual Conference Proceedings, 61, Published

Loseto, L., Stern, G., Richard, P., Orr, J. and Ferguson, S., 2005, Sexual segregation of Beaufort Beluga Whales during the Arctic Open-Water Season, 2005 ArcticNet Annual Conference Proceedings, 76, Published

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Pomerleau, C. and Stern, G., 2005, Mercury and Trace Metals Contaminants Trends in the Coastal Environment of the Canadian High Arctic, 2005 ArcticNet Annual Conference Proceedings, 87, Published

Cockney, C., Hansen-Craik, K. and Loseto, L., 2005, Northern Student Mentoring Program: Experiences and Perspectives, 2005 ArcticNet Annual Conference Proceedings, 11-12, Published

Rosenberg, B., Fuchs, C., Helm, P. and Stern, G., 2005, Effects of microbial activity on a-HCH degradation in Sea-water from the Southern Beaufort Sea – Amundsen Gulf Region, 2005 ArcticNet Annual Conference Proceedings, 92, Published

Couture, N.J., Allard, M., Solomon, Steve M., Forbes, D.L., Pollard, W.H., 2006, Canadian Arctic Network of Coastal Observatories – CANCO, 6th Arctic Coastal Dynamics International Workshop, 22-25 October 2006, Groningen, Netherlands, 1, Accepted

Lantuit, H., Rachold, V., Hubberten, H.-W., Pollard, W. H., Steenhuisen, F. and Couture, N., 2006, Towards a Recalculation of Carbon Release in the Arctic Ocean by Coastal Erosion: The Influence of Coastline Fractality, 6th Arctic Coastal Dynamics International Workshop, 22-25 October 2006, Groningen, Netherlands, 1, Accepted

Couture, N.J., Allard, M., Solomon, Steve M., Forbes, D.L., Pollard, W.H., 2006, Arctic Coastal Monitoring Sites: A Proposed Network to Monitor Impacts of Climate Change at Community, Regional, and Circum-Arctic Scales, Canadian Coastal Zone Conference, 14-18 August, 2006, Tuktoyaktuk, Canada, 1, Accepted

Leitch D., Carrie J., Wang F., Stern G., Lean D., Macdonald R. , 2006, The Mackenzie River Basin as a source of mercury to the Beaufort Sea., 8th International Conference on Mercury as a Global Pollutant. Madison, Wisconsin, USA., 1, Published

Leitch D., Stern G., Wang F., Couture N., Pollard W. , 2006, Coastal erosion and permafrost melt as a potential source of mercury to the Beaufort Sea, . 8th International Conference on Mercury as a Global Pollutant. Madison, Wisconsin, USA., 1, Published

Leitch D., Carrie J., Lean D., and Macdonald R., Stern G., and Wang F. , 2006, Riverine and coastal erosional input of mercury to the Beaufort Sea under a changing climate, . Coastal Zone Canada Conference. Tuktoyuktuk, NWT, Canada., 1, Published

Wang F., Stern G., Macdonald R., and Leitch D., 2006, Biogeochemical cycling of mercury in the Arctic Ocean: Gaps and progress, . Society of Environmental Toxicology and Chemistry (SETAC) – Asia/Pacific Annual Meeting. Beijing, China., 1, Published

Pomerleau C., Stern, G.A, 2006, Variation of mercury levels in zooplankton in a west-to-east gradient across the coastal Canadian High Arctic, 8th International Conference on Mercury as a Global Pollutant, Madison WS, 1, Accepted

Loseto L.L., Pazerniuk M., Pomerleau C., Ferguson, S.H., Prokopowicz, A., Fortier L., Stern G.A. , 2006, Spatial trends and factors affecting variation of mercury in zooplankton across the Canadian Arctic: Beaufort Sea, Amundsen Gulf, Archipelago, Baffin Bay, and Hudson Bay, CASES General meeting, Winnipeg, Manitoba , 1, Accepted

Pomerleau C., Stern, G.A., 2006, Mercury trends in zooplankton in the Canadian High Arctic, 2006 ArcticNet Annual Conference Proceedings, 1, Published

Leitch, D., Carrie, J., Wang, F., Stern, G., Macdonald, R., and Lean, D., 2006, The Mackenzie River as a source of mercury to the Beaufort Sea, 2006 ArcticNet Annual Conference Proceedings, 26, Published

Carrie, J., Sweet, A., Armstrong, D., Stern, G., and Wang, F., 2006, Mercury and other trace elements in coal in the Mackenzie River basin, 2006 ArcticNet Annual Conference Proceedings, 42, Published

Gade, A., L. Harwood, G. Stern, H. Melling, J. DeLaronde, G. Boila, A. MacHutchon, S. Ferguson, 2006, Mercury in ringed seals near Ulakatuk, NT, 2006, ArcticNet Annual Conference Proceedings, 1, Published

Pollard, W.H., 2007, The Vulnerability of Ice-rich Permafrost Coasts to Climate Change, Yukon North Slope Conference, Jan 30-Feb 1, 2007, Whitehorse, Canada, 1, Accepted

Pomerleau, C., Stern, G.A., Macdonald R.W., 2007, Linkage between mercury and oceanographic processes in marine pelagic zooplankton , 2007 CASES General Meeting, Quebec City, 1, Accepted

Sanei, H., Outridge, P.M., Wang, F., Armstrong, D., Fishback, L.-A., and Goodarzi, F., 2007, Results from one year` s monitoring of mercury in wet deposition at Churchill, Manitoba, 2007 Northern Contaminants Program Annual Results Workshop, Banff, Alberta, 1, Published

Wanag, F., Stern, G., Macdonald, R., Ferguson, S., outridge, P., Leitch, D., Loseto, L., Carrie, J., 2007, Toward a Mercury Mass Balance Model in Beaufort Sea: What Caused the Mercury Pollution in Beaufort Beluga Whales, 2007 ArcticNet Annual Conference Proceedings, 31, Published

Reid, D., Doyle, F., Mossop, D., 2007, The Fe Cycle in Arctic Ocean Sediments, 2007 ArcticNet Annual Conference Proceedings, 47, Published

Jantunen, L., Bidleman, T., Stern, G., Wong, F., 2007, Air-Waer Gas Exchange of Hexachlorocyclohexanes in the Eastern Canadian Archipelago, 2007 ArcticNet Annual Conference Proceedings, 64, Published

Jantunen, L., Bidleman, T., Stern, G., 2007, Air-Water Gas Exchange of Currently Used Pesticides, 2007 ArcticNet Annual Conference Proceedings, 65, Published

Loseto, L., Stern, G., Ferguson, S., 2007, Mercury Levels Defined by Beluga Habitat Use Revealed by Fatty Acids and Stable Isotopes, 2007 ArcticNet Annual Conference Proceedings, 73, Published

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Specialized Publications

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Luque, S. P. and S. H. Ferguson, 2006, Age structure, and mortality of eastern Beaufort sea beluga (*Delphinapterus leucas*): a comparison among Canadian populations, Canadian Inuvialuit Fisheries Joint Management Committee Report Series, 27 pp, Accepted