ANNUAL REPORT ON GEOTRACES ACTIVITIES IN CANADA
MAY 2014 – JUNE 2015

Cruises

- GEOTRACES Arctic cruises: Labrador Sea, Baffi Bay and Canadian Arctic Archipelago; July 10-August 10, 2015 (Leg 2).
- GEOTRACES Arctic cruises: Beaufort Sea; September 4-October 1st, 2015 (Leg 3B).

Cruise Outreach:
http://pwias.ubc.ca/media-centre/wall-papers/fall-2014/predicting-changes-in-the-arctic-with-the-geotraces-project/

Cruise BLOG:
blogs.ubc.ca/geotraces2015

Radio interview:
CBC Radio; "As it happens", July 22, 2015: *Ice Scientists*
http://www.cbc.ca/radio/popup/audio/player.html?autoPlay=true&clipIds=26723718977,2672329229

Individual achievements

Diana Varela; Biology Dept., University of Victoria, Victoria, BC

- *Arctic Geotraces Productivity group meeting (UVic and UBC): Sept. 11, 2014*
  A conference call with the other members of the Canadian Arctic Geotraces group at UBC to discuss the scope of primary productivity measurements and potential collaborations and data sharing between groups for the upcoming Arctic Geotraces cruise

- *Geotraces - ArcticNET Joint Meeting (Laval University): Oct 27-28, 2014*
  Travelled to Quebec to participate in a two day meeting with other Geotraces and ArcticNet participants regarding the upcoming summer 2015 Arctic cruise on the CCGS Amundsen. The second day of the meeting included a ship visit with discussions of lab and deck space allocation.

- *Stable silicon isotope inter-calibration plans (UVic-Canada, UC Santa Barbara-USA, University of Brest-France): January - June, 2015*
  A series of discussions with collaborators in both the United States and France regarding intercalibration of the stable silicon isotope measurements on our respective Arctic Geotraces cruises. Samples with be collected at a crossover station for intercalibration with our US colleagues, while we will be collecting samples to share with our French colleagues as their crossover station (that they have already visited) was deemed unsuitable for intercalibration.

- *Stable silicon isotope analysis training (UBC): April 13-16, 2015*
  Travelled to Vancouver and worked with Nicolas Estrade to learn a new methodology for measuring the stable silicon isotope composition of seawater. This initial training was on

the preparation of the samples for analysis using a pre-concentration of silicic acid in seawater.

- *Geotraces - ArcticNet Productivity group meeting (UVic, UBC, ArcticNet): April 22, 2015*
  A conference call between members of the Geotraces and ArcticNet productivity groups to discuss deck space for incubators and potential collaborations and equipment sharing on the upcoming cruise.

Alfonso Mucci, Department of Earth and Planetary Sciences**,** McGill University, Montreal, QC

Refereed journal publications

- MILLER L.A., GIESBRECHT K.E., MUCCI A. and ZIMMERMAN S. (2014) Changes in the marine carbonate system of the western Arctic: Patterns in a rescued data set. Polar Research 33: 20577-20593. doi.org/10.3402/polar.v33.20577
- GIESBRECHT K.E., MILLER L.A., ZIMMERMAN S., CARMACK E., JOHNSON W.K., MACDONALD R.W., MCLAUGHLIN F., MUCCI A., WILLIAMS W.J. and WONG C.S. and YAMAMOTO-KAWAI M. (2014) Measurements of the dissolved inorganic carbon system and associated biogeochemical parameters in the Canadian Arctic, 1974-2009. Earth System Science Data 6: 91-104. doi: 10.5194/essdd-6-91-2014.

Presentations

- The Canadian Arctic GEOTRACES Program : Biogeochemical and tracer study of a rapidly changing Arctic Ocean. Meeting of the NSERC-CCAR Networks, May 3, 2015

Media interviews

- Opinion: Ocean acidification is an indisputable problem
  The Gazette, June 22, 2015
  http://montrealgazette.com/news/world/opinion-ocean-acidification-is-an-indisputable-problem

- Des lacs saskatchewanais ralentissent le réchauffement climatique
  Radio-Canada Saskatoon
  Interview by William Burr
  http://ici.radio-canada.ca/regions/saskatchewan/2015/02/25/007-lacs-saskatchewan-rechauffement-climatique-revue-nature.shtml?isAutoPlay=1

- Les Années Lumières, Radio-Canada – October 19, 2014
  Les oceans brûlés: Un impact des changements climatiques
  Interview with Chantal Srivastava
  http://www.radio-canada.ca/util/postier/suggerer-go.asp?nID=1214390

- Première chaîne de Radio-Canada – October 16, 2014
  Interviews about ocean acidification with:
  Stéphane Côté – Halifax
  Denis Duchesne – Charlottetown
  Marie Villeneuve – Vancouver

Jean Fontaine – Winnipeg
Michel Plourde – Sept-Îles
Jacques Montpetit – Rimouski
Doris Labrie – Regina
Sandra Gagnon – Edmonton/Calgary
Jean-Pierre Girard – Saguenay
Réjean Blais – Sherbrooke

- CBC International on the web – October 9, 2014
  Interview about ocean acidification with Marc Montgomery

- La Presse – October 9, 2014 (section Actualités)
  Interview with Charles Côté
  Acidification des océans: Les eaux canadiennes durement frappées
  http://plus.lapresse.ca/screens/1752d663-d612-4066-93e7-578499367521|_0.html

- La Presse – June 17, 2014
  Interview on ocean acidification with Mathieu Perreault

- Le Banc Public – CHOQ-FM, June 16, 2014
  Radio interview by Marion Bérubé - Le Saint-Laurent s'acidife.
  http://www.choq.ca/emissions/bancpublic

- Le Devoir, June 12, 2014
  Le Saint-Laurent étouffé par l'acidification (front page)

- TVA/Rimouski, June 4, 2014
  L'acidification du fleuve Saint-Laurent.

- Le monde aujourd'hui, Radio-Canada/Rimouski, June 3, 2014
  Le fleuve Saint-Laurent et les changements climatiques.

- Le Code Chastenay, Télé-Québec, February 18, 2014
  Le fleuve Saint-Laurent s'acidifie.

Celine Gueguen; Chemistry Dept., Trent University, Peterborough, ON

- V. Mangal, C. Guéguen (2014) Examining sulfur-containing proteins in both intracellular and extracellular fractions of the freshwater algae Scenedesmus using AsFlFFF. 17th International symposium on field- and flow-based separations. Salt Lake City, Utah, Oct 12-16, 12014. Oral presentation
- V. Mangal, C. Guéguen (2015) Examining concentrations and molecular weights of thiols in microorganism cultures and in Churchill River (Manitoba) using a fluorescent-labeling method coupled to asymmetrical flow field-flow fractionation. Anal Bioanal Chem (2015) 407:4305–4313

Andrew Ross; Fisheries and Oceans Canada, IOS, Sydney, BC

- I assisted in collecting samples for analysis of iron and other trace metals on the August/September Line-P cruise (2014-19) last year in support of our Line-P Iron Program (which is recognized as a Process Study by GEOTRACES).

- I've also been supervising Kyle Simpson on his development of a new Fe analysis system here at DFO-IOS.

- I am also going to submit an abstract for a SCOR WG 139/Frontiers in Marine Biogeochemistry special issue on organic ligands in a couple of days, if that counts (the abstract describes validation of the method my grad student has been developing and will be using to recover and analyze organic ligands in samples collected during the upcoming Arctic GEOTRACES cruise).

Kristin Orians; Earth, Ocean & Atmospheric Sciences, UBC, Vancouver

Publications:

- McAlister, J. and Orians, K. (2015) Dissolved Ga in the Beaufort Sea of the Western Arctic Ocean: A GEOTRACES cruise in the International Polar Year. Marine Chemistry (in press May 22) http://www.sciencedirect.com/science/article/pii/S0304420315001115

Conference presentations:
- McAlister, J., Charters, J., Orians, K. (2014) Sources of Pb to the North Pacific: temporal and spatial distributions. Chemistry of the Sea and Sky, 97th Canadian Chemistry Conference (CSC 2014), Vancouver British Columbia May 2014.
- Sim, N. and Orians, K. (2014) Dissolved Manganese in the Northeast Pacific: Line-P, 2011-2012. AGU/ASLO Ocean Sciences 2014 (Honolulu, Hawaii, USA)
- Cain, A. and Orians, K. (2014) Dissolved Aluminum in the Northeast Pacific. AGU/ASLO Ocean Sciences 2014 (Honolulu, Hawaii, USA)

Thesis:
- McAlister, J. Biogeochemistry of dissolved gallium and lead isotopes in the northeast Pacific and western Arctic Oceans. Ph.D. Thesis, Oceanography, UBC (April 2015)

Jay Cullen; Earth & Ocean Sciences, University of Victoria, Victoria, BC

Articles published in refereed journals
(* indicates UVic supervised graduate student/HQP, ** indicates a UVic supervised undergraduate student)

- *Janssen, D.J. and J.T. Cullen. (in press) Decoupling of zinc and silicic acid in the subarctic northeast Pacific interior. Marine Chemistry
- *Schallenberg, C., **A.B. Davidson, K.G. Simpson, L.A. Miller and J.T. Cullen. (in press) Iron(II) variability in the northeast subarctic Pacific Ocean. Marine Chemistry
- Quay, P., J.T. Cullen, P. Morton and W. Landing. (in press). Processes controlling the distributions of Cd and PO4 in the ocean. Global Biogeochemical Cycles

- *Janssen, D.J., T.M. Conway, S.G. John, J. Christian, D.I. Kramer, T.F. Pedersen and J.T. Cullen. (2014) Undocumented water column sink for cadmium in open ocean oxygen deficient zones. Proceedings of the National Academy of Sciences, 111(19): 6888-6893 doi: 10.1073/pnas.1402388111
- Mélançon, J., M. Levasseur, M. Lizotte, P. Delmelle, J.T. Cullen, R. C. Hamme, A. Peña, K. Simpson, M. Scarratt, Jean-Éric Tremblay *J. Zhou, K. Johnson, N. Sutherland, N. Nemcek, M. Arychuk and M. Robert. (2014) Early response of the northeast subarctic Pacific plankton assemblage to volcanic ash fertilization. Limnology and Oceanography, 59(1), 55–67 doi:10.4319/lo.2014.59.1.0055

Presentations at conferences or institutions

(* indicates invited presentation, **indicates UVic graduate student/HQP, ***indicates UVic undergraduate student)

- 2014 Cullen, J.T., **D.J. Janssen, J. Christian, T.M. Conway and S.G. John. An Undocumented Water Column Sink for Cadmium in Open Ocean Oxygen Minimum Zones. Goldschmidt 2014, Jun. 8-13, Sacramento, CA USA.
- 2014 Galer, S.J.G., W. Abouchami, R. Xie, **D.J. Janssen, M. Rijkenberg, L. Gerringa, J.T. Cullen and H. de Baar. Global Oceanic Cadmium Isotope Distribution. Goldschmidt 2014, Jun. 8-13, Sacramento, CA USA.
- 2014 John, S.G., T.M. Conway, **D.J. Janssen and J.T. Cullen. Cadmium Sulfide Formation in Low-Oxygen Waters of the North Atlantic. Goldschmidt 2014, Jun. 8-13, Sacramento, CA USA.
- 2014 **Janssen, D.J., J.T. Cullen, W. Abouchami, S.J.G. Galer and H. de Baar. Cadmium Isotopes along the Line-P Transect in the Northeast Subarctic Pacific. Goldschmidt 2014, Jun. 8-13, Sacramento, CA USA
- 2014 *Cullen, J.T. and **J. Zhou. Deep-sea Loss of Dissolved Iron in the Arctic Ocean: Potential Insight into the Oceanic Budget of an Essential Trace Nutrient. Canadian Chemistry Conference and Exhibition, Jun. 1-5, Vancouver, BC Canada.
- 2014 **D.J. Janssen and J.T. Cullen. Improvements to a Fluorescence-Based Flow-Injection Method For Shipboard Determination of Dissolved Zn. 2014 Ocean Sciences Meeting, Feb. 23-28, Honolulu, HI USA.
- 2014 **Schallenberg, C., ***A.B. Davidson and J.T. Cullen. Iron(II) Variability in the Northeast Subarctic Pacific Ocean. 2014 Ocean Sciences Meeting, Feb. 23-28, Honolulu, HI USA.
- 2014 Vance, D., S. Little, Y. Zhao, J.T. Cullen, G. de Souza and M.C. Lohan. The Oceanic Cycle of Zinc and its Isotopes: The Key Roles of Southern Ocean Export and Vertical Biogeochemical Cycling. 2014 Ocean Sciences Meeting, Feb. 23-28, Honolulu, HI USA.

Maite Maldonado; Earth, Ocean & Atmospheric Sciences, UBC, Vancouver, BC

- Participated in the Particulate Metals intercalibration, lead by Phoebe Lam

- Participated in SCOR Working Group 139 workshop and meeting in May; Sibenik, Croatia.

- Full Member of SCOR Working Group 145: Modelling Chemical Speciation in Seawater to Meet 21st Century Needs (MARCHEMSPEC)

Roger Francois; Earth, Ocean & Atmospheric Sciences, UBC, Vancouver, BC

Publications

- Brown, K. A, L. A. Miller, C. J. Mundy, T. Papakyriakou, R. Francois, M. Gosselin, G. Carnat, K. Swystun, P. D. Tortell. Inorganic carbon system dynamics in landfast sea ice during the early-melt period. J. Geophysical Res. – Ocean (in press)
- Scheiderich, K, M. Amini, C. Holmden, and R. Francois. Global variability of Chromium isotopes in seawater demonstrated by Pacific, Atlantic, and Arctic Ocean samples. Earth and Planetary Science Letters. (in press)
- Jonkers. L, R. Zahn, A.Thomas, G. Henderson, W. Abouchami, R. Francois, P. Masque, I. R. Hall, and T. Bickert. (2015) Deep circulation changes in the central South Atlantic during the past 145 kyrs inferred from a combined sedimentary 231Pa/230Th, neodymium isotopes and benthic δ13C record. Earth and Planetary Science Letters 419, 14-21.
- Holmden, C., Amini, M. and Francois, R. (2015) Uranium isotope fractionation in Saanich Inlet: A modern analog study of a paleoredox tracer. Geochim. Cosmochim. Acta 153, 202-215.
- Albani B. S., N. M. Mahowald, G. Winckler, R. F. Anderson, L. I. Bradtmiller, B. Delmonte, R. Francois, M. Goman, N. G. Heavens, P. P. Hesse, S. A. Hovan, K. E. Kohfeld, H. Lu, V. Maggi, J. A. Mason, P. A. Mayewski, D. McGee, X. Miao, B. L. Otto-Bliesner, A. T. Perry, A. Pourmand, H. M. Roberts, N. Rosenbloom, T. Stevens, and J. Sun. (2104) Twelve thousand years of dust: the Holocene global dust cycle constrained by natural archives. Climate of the Past 10, 4277-4363
- Brown, K. A., L.Miller, M. Davelaar, R. Francois, and P. D. Tortell (2014). Over-determination of the carbonate system in natural sea ice brine and assessment of carbonic acid dissociation constants under low temperature, high salinity conditions. Mar. Chem. 165, 36–45.
- Honjo, S., T. I. Eglinton, C. D. Taylor, K. M. Ulmer, S. M. Sievert, A. Bracher, C. German, V. Edgcomb, R. Francois, D. M. Iglesias-Rodriguez, B. van Mooy, and D. J. Repeta (2014). Understanding the Role of the Biological Pump in the Global Carbon Cycle: An Imperative for Ocean Science. Oceanography 27 (3), 10 – 16.
- Luo, Y., M. Miller, B. De Baere, M. Soon, and R. Francois (2014) POC fluxes measured by sediment traps and 234Th:238U disequilibrium in Saanich Inlet, British Columbia. Mar. Chem. 162, 19-29.
- Brown, K. A., F. McLaughlin, P. D. Tortell, D. E. Varela, M. Yamamoto-Kawai, B. Hunt, R. Francois (2014), Determination of particulate organic carbon sources to the surface mixed layer of the Canada Basin, Arctic Ocean, J. Geophys. Res. Oceans, 119, doi:10.1002/2013JC009197

Submitted by Maite Maldonado (mmaldonado@eos.ubc.ca).