

CURRICULUM VITAE

ROBERTA C. HAMME

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Major fields of scholarly interest

- Gases as tracers of oceanic physical and biological processes
- Ocean carbon cycle and anthropogenic changes
- Water mass formation processes
- Rates of marine organic carbon production and export
- Oceanic nitrogen cycle
- Air-sea gas exchange
- Development of high precision gas analysis methods

Education

- PhD** 2003, Chemical Oceanography, University of Washington, Seattle, WA.
"Applications of neon, nitrogen, argon and oxygen to chemical, physical and biological cycles in the ocean" Advisor: Steven Emerson
- MSc** 1996, Chemical Oceanography, University of Washington, Seattle, WA.
"Barium geochemistry of corals from the Great Barrier Reef" Advisors: Glen Shen, Russ McDuff
- BA** 1993, Chemistry (summa cum laude) Pomona College, Claremont, CA

Employment

- 2013-present *Associate Professor*
School of Earth and Ocean Sciences, University of Victoria, Victoria, BC, Canada.
- 2006-2013 *Assistant Professor*
School of Earth and Ocean Sciences, University of Victoria, Victoria, BC, Canada.
- 2003-2006 *Postdoctoral Scholar* with Ralph Keeling
Scripps Institution of Oceanography, UCSD, La Jolla, CA, USA
- 1996-1998 *Analytical Chemist*
Scott Semiconductor Gases, Fremont, CA, USA

Publications (underlined = student directly supervised)

- Reeve, J.L., **R.C. Hamme**, and W.J. Williams (2019) Tracing denitrification in the Canada Basin: N₂ loss to the atmosphere on the Chukchi Shelf and benthic inputs in deep waters. *Deep-Sea Research I*, 143, 127–138, doi: 10.1016/j.dsr.2018.11.003
- Hamme, R.C.**, D.P. Nicholson, W.J. Jenkins, and S.R. Emerson (2019) Using noble gases to assess the ocean's carbon pumps. *Annual Review of Marine Science*, 11, 75–103, doi:10.1146/annurev-marine-121916-063604
- Teeter, L., **R.C. Hamme***, D. Ianson, and L. Bianucci (2018) Accurate estimation of net community production from O₂/Ar measurements. *Global Biogeochemical Cycles*, 32, 1163–1181, doi:10.1029/2017GB005874
Chosen for a Research Spotlight
- Krogh, J., D. Ianson, **R.C. Hamme**, and C.J. Lowe (2018) Risks of hypoxia and acidification in the high energy coastal environment near Victoria, Canada's untreated municipal sewage outfalls. *Marine Pollution Bulletin*, 133, 517–531, doi:10.1016/j.marpolbul.2018.05.018

- Wolf, M.K., **R.C. Hamme**, D. Gilbert, I. Yashayaev, and V. Thierry (2018) Oxygen saturation surrounding deep water formation events in the Labrador Sea from Argo-O₂ data. *Global Biogeochemical Cycles*, 32, doi:10.1002/2017GB005829
- Izett, R.W., C.C. Manning, **R.C. Hamme**, and P.D. Tortell (2018) Refined estimates of net community production in the Subarctic Northeast Pacific derived from $\Delta\text{O}_2/\text{Ar}$ measurements with N₂O-based corrections for vertical mixing. *Global Biogeochemical Cycles*, 32, 326–350, doi:10.1002/2017GB005792
- Hamme, R.C.**, S.R. Emerson, J.P. Severinghaus, M.C. Long, and I. Yashayaev (2017) Using noble gas measurements to derive air-sea process information and predict physical gas saturations. *Geophysical Research Letters*, 44, 9901–9909, doi:10.1002/2017GL075123
- Hamme, R.C.**, J.E. Berry, J.M. Klymak, K.L. Denman (2015) In situ O₂ and N₂ measurements detect deep-water renewal dynamics in seasonally-anoxic Saanich Inlet. *Continental Shelf Research*, 106, 107–117, doi: 10.1016/j.csr.2015.06.012
- Mélançon, J., M. Levasseur, M. Lizotte, P. Delmelle, J. Cullen, **R.C. Hamme**, A. Peña, K.G. Simpson, M. Scarratt, J.-É. Tremblay, J. Zhou, K. Johnson, N. Sutherland, M. Arychuk, N. Nemcek 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.
- Bourbonnais, A., M.F. Lehmann, **R.C. Hamme**, C.C. Manning and S.K. Juniper (2013) Nitrate elimination and regeneration as evidenced by dissolved inorganic nitrogen isotopes in Saanich Inlet, a seasonally anoxic fjord. *Marine Chemistry*, 157, 194–207, doi:10.1016/j.marchem.2013.09.006.
- Hamme, R.C.**, and S.R. Emerson (2013) Deep-sea nutrient loss inferred from the marine dissolved N₂/Ar ratio. *Geophysical Research Letters*, 40, 1149–1153, doi:10.1002/grl.50275
- Emerson, S., T. Ito, and **R.C. Hamme** (2012) Argon supersaturation indicates low decadal-scale vertical mixing in the ocean thermocline. *Geophysical Research Letters*, 39, L18610, doi: 10.1029/2012GL053054.
- Giesbrecht, K.E., **R.C. Hamme**, and S.R. Emerson (2012) Biological productivity along Line P in the subarctic northeast Pacific: in-situ versus incubation-based methods. *Global Biogeochemical Cycles*, 26, GB3028, doi:10.1029/2012GB004349
- Hamme, R.C.**, N. Cassar, V.P. Lance, R.D. Vaillancourt, M.L. Bender, P.G. Strutton, T.S. Moore, M.D. DeGrandpre, C.L. Sabine, D.T. Ho, and B.R. Hargreaves (2012) Dissolved O₂/Ar and other methods reveal rapid changes in productivity during a Lagrangian experiment in the Southern Ocean. *Journal of Geophysical Research*, 117, C00F12, doi:10.1029/2011JC007046
- Moore, T.S., M.D. DeGrandpre, C.L. Sabine, C.J. Zappa, W.R. McGillis, **R.C. Hamme**, R.A. Feely, and W.M. Drennan (2011) Sea surface pCO₂ and O₂ in the Southern Ocean during the austral fall, 2008. *Journal of Geophysical Research - Oceans*, 116, C00F11, doi: 10.1029/2010JC006560.
- Ho, D.T., C.L. Sabine, D. Hebert, D.S. Ullman, R. Wanninkhof, **R.C. Hamme**, P.G. Strutton, B. Hales, J.B. Edson, and B.R. Hargreaves, 2011. Southern Ocean Gas Exchange Experiment: Setting the stage. *Journal of Geophysical Research - Oceans*, 116, C00F08, doi:10.1029/2010JC006852.
- Ito, T., **R.C. Hamme**, and S. Emerson (2011) Temporal and spatial variability of noble gas tracers in the North Pacific. *Journal of Geophysical Research - Oceans*, 116, C08039, doi:10.1029/2010JC006828.
- Nicholson, D., S. Emerson, S. Khatiwala, and **R.C. Hamme** (2011) An inverse approach to estimate bubble-mediated air-sea gas flux from inert gas measurements. Proceedings of the 6th International Symposium on Gas Transfer at Water Surfaces, Kyoto University Press, 223–237.
- Nicholson, D., S. Emerson, N. Caillon, J. Jouzel and **R.C. Hamme** (2010) Constraining ventilation during deep-water formation using deep-ocean measurements of the dissolved gas ratios ⁴⁰Ar/³⁶Ar, N₂/Ar and Kr/Ar. *Journal of Geophysical Research - Oceans*, 115(C11), C11015, doi:10.1029/2010JC006152.
- Manning, C., **R.C. Hamme**, and A. Bourbonnais (2010) Impact of deep-water renewal events on fixed nitrogen loss from seasonally-anoxic Saanich Inlet. *Marine Chemistry*, 122 (1-4), 1–10, doi: 10.1016/j.marchem.2010.08.002.
- Hamme, R.C.**, P.W. Webley, W.R. Crawford, F.A. Whitney, M.D. DeGrandpre, S.R. Emerson, C.C. Eriksen, K.E. Giesbrecht, J.F.R. Gower, M.T. Kavanaugh, M.A. Peña, C.L. Sabine, S.D. Batten, L.A. Coogan, D.S. Grundle, and D. Lockwood (2010) Volcanic ash fuels anomalous plankton bloom in subarctic northeast Pacific. *Geophysical Research Letters*, 37, L19604, doi:10.1029/2010GL044629
- Juraneck, L.W., **R.C. Hamme**, J. Kaiser, R. Wanninkhof, and P.D. Quay (2010) Evidence of O₂ consumption in underway seawater lines: Implications for air-sea O₂ and CO₂ fluxes. *Geophysical Research Letters*, 37(1), doi:10.1029/2009GL040423.

- Cassar, N., B.A. Barnett, M.L. Bender, J. Kaiser, **R.C. Hamme**, and B. Tilbrook (2009) Continuous high-frequency dissolved O₂/Ar measurements by Equilibrator Inlet Mass Spectrometry. *Analytical Chemistry*, 81(5), 1855–1864.
- Hamme, R.C.**, and R.F. Keeling (2008) Ocean ventilation as a driver of interannual variability in atmospheric potential oxygen. *Tellus B*, 60(5), p. 706–717.
- Hamme, R.C.**, and J.P. Severinghaus (2007) Trace gas disequilibria during deep-water formation. *Deep Sea Research I*, 54(6), 939–950.
- Ito, T., C. Deutsch, S. Emerson, and **R.C. Hamme** (2007) The impact of diapycnal mixing on the saturation state of argon in the subtropical North Pacific. *Geophysical Research Letters*, 34(9), L09602, doi:10.1029/2006GL029209.
- Hamme, R.C.**, and S.R. Emerson (2006) Constraining bubble dynamics and mixing with dissolved gases: Implications for productivity measurements by oxygen mass balance, *Journal of Marine Research*, 64(1), 73–95.
- Hamme, R.C.**, and S.R. Emerson (2004) The solubility of neon, nitrogen and argon in distilled water and seawater. *Deep-Sea Research I*, 51(11), 1517–1528.
- Hamme, R.C.**, and S.R. Emerson (2004) Measurement of dissolved neon by isotope dilution using a quadrupole mass spectrometer. *Marine Chemistry*, 91(1-4), p. 53-64.
- Hamme, R.C.**, and S.R. Emerson (2002) Mechanisms controlling the global oceanic distribution of the inert gases argon, nitrogen and neon. *Geophysical Research Letters*, 29(23), 2120, doi:10.1029/2002GL015273

Students Advised

Postdoctoral fellow: Jeffry Sorensen (2016-2018)

PhD: Amanda Timmerman (2014-ongoing, defending 13 Sept 2019)

PhD co-supervised: Michaela Meier (2018-ongoing)

MSc: Ahron Cervania (2018-ongoing), Mitchell Wolf (completed 2017), Jennifer Reeve (completed 2016), Karina Giesbrecht (completed July 2010)

MSc co-supervised: Jeremy Krogh (2015-ongoing), Lianna Teeter (completed Dec 2014), Alejandra Lara-Espinosa (completed Dec 2012)

Undergraduate research projects: Wylee Fitz-Gerald (Honours thesis April 2019), Justin Szabo (Honours thesis April 2018), Johanna Berry (NSERC USRA summer 2012, Honours thesis April 2013), Cara Manning (NSERC USRA summer 2008, Honours thesis April 2010)

Undergraduate lab assistants: Jai Cunningham (2019), Cassandra Purdon (2018-2019), Erinn Raftery (2015-2017), Lincoln Hood (2014), Petra Clementson (2012-2013), Tyler Wilson (2011-2012), Rebeccah McLean (2009-2010), Courtney Dean (2008-2009)