

CURRICULUM VITAE

ROBERTA C. HAMME

School of Earth and Ocean Sciences
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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)

- Hamme, R.C.**, and S.R. Emerson (2013) Deep-sea nutrient loss inferred from the marine dissolved N₂/Ar ratio, *Geophys. Res. Lett.*, 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, *Geophys. Res. Lett.*, 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 Biogeochem. 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, *J. Geophys. Res.*, 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, *J. Geophys. Res.*, 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, *J. Geophys. Res.*, 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, *J. Geophys. Res.*, 116, C08039, doi:10.1029/2010JC006828.
- Nicholson, D., S. Emerson, S. Khatiwala, **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 $^{40}\text{Ar}/^{36}\text{Ar}$, N_2/Ar and Kr/Ar , *J. Geophys. Res.*, 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, *Mar. Chem.*, 122 (1-4), p. 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, *Geophys. Res. Lett.*, 37, L19604, doi:10.1029/2010GL044629.
- Juranek, L.W., **R.C. Hamme**, J. Kaiser, R. Wanninkhof, and P.D. Quay (2010) Evidence of O_2 consumption in underway seawater lines: Implications for air-sea O_2 and CO_2 fluxes, *Geophys. Res. Lett.*, 37, L01601, 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 O_2/Ar measurements by Equilibrator Inlet Mass Spectrometry, *Anal. Chem.*, 81(5), p. 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 Res. I*, 54(6), p. 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. *Geophys. Res. Lett.*, 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, *J. Mar. Res.*, 64(1), p. 73-95.
- Hamme, R.C.**, and S.R. Emerson (2004) The solubility of neon, nitrogen and argon in distilled water and seawater. *Deep-Sea Res. I*, 51(11), p. 1517-1528.
- Hamme, R.C.**, and S.R. Emerson (2004) Measurement of dissolved neon by isotope dilution using a quadrupole mass spectrometer. *Mar. Chem.*, 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. *Geophys. Res. Lett.*, 29(23), 2120, doi:10.1029/2002GL015273.

Research Grants and Contracts

- Ventilation, Interactions and Transports Across the Labrador Sea (VITALS) (2013) Canada Natural Sciences and Engineering Research Council (NSERC) Climate Change and Atmospheric Research (CCAR) Grant to P Myers lead PI.
- The Canadian Arctic GEOTRACES Program: Biogeochemical and tracer study of a rapidly changing Arctic Ocean (2013) Canada Natural Sciences and Engineering Research Council (NSERC) Climate Change and Atmospheric Research (CCAR) Grant to R Francois lead PI.
- Measuring ocean mixing at Station Papa (2012) Canada Natural Sciences and Engineering Research Council (NSERC) Research Tools and Instruments (RTI) Grant to J Klymak lead PI.
- Using high precision dissolved gas measurements to constrain the ocean carbon cycle (2012) Canada Natural Sciences and Engineering Research Council (NSERC) Discovery Grant to R Hamme.
- The marine dissolved N_2/Ar ratio: A tracer for deep ocean denitrification? (2010) US NSF Chemical Oceanography subcontract to R Hamme (S Emerson lead PI)
- A membrane inlet mass spectrometer for dissolved gas analysis in natural waters (2007) Canada Natural Sciences and Engineering Research Council (NSERC) Research Tools and Instruments (RTI) Grant to P Tortell lead PI.

Geochemical laboratory for the high precision analysis of dissolved gases (2007) Canadian Foundation for Innovation and British Columbia Knowledge Development Fund to R Hamme.
Gaseous tracers of deep-water formation, mixing and ocean productivity (2006) Canada Natural Sciences and Engineering Research Council (NSERC) Discovery Grant to R Hamme.
Measuring diapycnal mixing in the upper ocean thermocline using noble gas supersaturation (2006) US NSF Chemical Oceanography subcontract to R Hamme (S Emerson lead PI)

Students Advised

MSc: Karina Giesbrecht (completed July 2010), Rhiana Bams (2011-2012)
MSc co-supervised: Lianna Teeter (on-going), Alejandra Lara-Espinosa (completed Dec 2012)
Undergraduate research projects: Johanna Berry (NSERC USRA summer 2012, Honours thesis April 2013), Cara Manning (NSERC USRA summer 2008, Honours thesis April 2010)
Undergraduate lab assistants: Tyler Wilson (2011-2012), Rebeccah McLean (2009-2010), Courtney Dean (2008-2009)

Teaching Experience

2007-12 Chemical Oceanography (EOS 312, undergraduate)
University of Victoria, School of Earth and Ocean Sciences
Designed and taught summer class in Ocean Sciences Minor, open to science majors. Block plan format, extensive cooperative learning, class project leads from planning and sampling Saanich Inlet, through lab analysis, to poster presentation of results. (10-25 students)

2011-12 Understanding the Oceans (EOS 350, undergraduate) co-taught with John Dower
University of Victoria, School of Earth and Ocean Sciences
Taught physical and chemical oceanography portion of discussion / lecture class open to any student at the university, focusing on scientific literacy about ocean issues of societal concern. (~70 students)

2009, 2011-12 Oceans and Atmosphere (EOS 110, undergraduate) co-taught with Kim Juniper, Diana Varela
University of Victoria, School of Earth and Ocean Sciences
Taught physical and chemical oceanography and atmospheric science portion of large lecture, survey class aimed at first-year undergraduates. (~250 students)

2012 Geochemical Modelling (EOS 504D, graduate)
University of Victoria, School of Earth and Ocean Sciences
Taught class on practical application of modeling concepts frequently encountered in chemical oceanography and related fields. Extensive MatLab assignments. (7 students)

2007, 2009, 2011 Chemical Oceanography (EOS 504A, graduate) 2007 and 2011 co-taught with Jay Cullen
University of Victoria, School of Earth and Ocean Sciences
Taught introductory level chemical oceanography class for graduate students (mass balance, chemical distributions in the ocean, carbonate chemistry, etc.). Discussion and quantitative problem sets. (3-5 students)

2006-09 Understanding the World's Oceans (EOS 350, undergraduate) co-taught with John Dower
University of Victoria, School of Earth and Ocean Sciences
Taught physical and chemical oceanography portion of lecture class open to any student at the university, focusing on a broad overview of oceanography. (~60 students)

2006 Isotopes in Earth and Ocean Sciences (EOS 430, undergraduate) co-taught with Abigail Barker
University of Victoria, School of Earth and Ocean Sciences
Taught stable isotope portion of class aimed at senior undergraduate earth science majors.

2005-09 *Guest lecturer:* Research Frontiers in Earth and Ocean Science (EOS 525), Advanced Isotope Geochemistry (SIO)

2004 Biogeochemistry of the Coastal Margin (mainly graduate) co-taught with Tim Lueker.
Scripps Institution of Oceanography, Marine Chemistry and Geochemistry

- Paper discussion class for undergraduates, graduate students, and faculty.
- 2004 North Pacific Nutrient Transport (mainly graduate) co-taught with Ralph Keeling.
Scripps Institution of Oceanography, Marine Chemistry and Geochemistry
Paper discussion class for graduate students and faculty.

Service Activities

- Steering committee member – VITALS Labrador Sea Project (2013-present)
 Convener – Gases as Tracers of Oceanic Processes, AGU Ocean Sciences meeting 2012
 Co-convener – Documenting a Changing Ocean through International Multidisciplinary Collaborations, AAAS Annual Meeting 2012
 Convener – Gases as Tracers of Oceanic Processes, AGU Ocean Sciences meeting 2010
 Co-convener – Air-Sea Gas Exchange, AGU Fall meeting 2008
 Convener – Gases as Tracers of Oceanic Processes, AGU Fall meeting 2006
 Convener – Gaseous Tracers of Oceanic Physical and Biogeochemical Processes, AGU Fall meeting 2004
- UVic SEOS Honours Advisor (2008-2010, 2011- 2013)
 UVic SEOS Co-op Advisor (2011-2012)
 Founded *Publish Before We Perish* writing group for UVic Science Faculty
 UVic SEOS Undergraduate Committee (2007-2010, 2011-2013)
 UVic Ocean and Marine Research Working Group (Council of Canadian Academies study coordinator)
 UVic SEOS Seminar Organizer (2009 Spring term)
 UVic SEOS Graduate Committee (2006-2007)
 Organized Worldwide University Network (WUN) videoconference seminar series at Scripps (2004-2006)

Outreach Activities

- 2010 Press coverage for Volcanic ash fuels anomalous plankton bloom paper
 Radio Interviews: CBC Quirks and Quarks, Victoria CFX 1020 Talk Radio, Seattle WA KUOW-NPR, Dillingham AK KDLG-NPR
 Print Interviews: ScienceNOW, The Globe and Mail, Nature News, Discovery News, Our Amazing Planet, Forskning.no (Norway), Science et Vie (France), UVic Science Matters
- 2009 Workshop Leader: STEM Aboriginal Youth Tours, University of Victoria
 Led laboratory workshops for First Nations high school students to increase their exposure to and interest in science
- 2008-2009 Laboratory Intro/Tours: Opening of Wright Bldg. 2008, Donors Dinner 2009, Earth Science Articulation Meeting 2009, University of Victoria
 Gave brief introductions to work and equipment in Gas Tracers Lab for donors, colleagues, media, and public
- 1995-2005 Workshop Leader: Expanding your Horizons University of California, San Diego; Shoreline and Bellevue Community Colleges
 Led laboratory workshops for high school girls to increase their exposure to and interest in science

Field Experience

- Sept 1993; Aug 1999; Hawaii Ocean Time-series # 49, 107, 117-118, 121-122, 125-127, and 252: Gas sample collection and O₂ analysis
 Aug 2000-Jun 2001;
 May 2013
- Jul 2007-2012 Saanich Inlet: EOS 312 student cruises
 Oct, Dec 2008; Feb 2009 Saanich Inlet: Dissolved gas sample collection
 Feb-Apr 2008 Southern Ocean Gas Exchange Experiment: Gas sample collection, monitoring of surface water by mass spectrometry, O₂ analysis
 May 2007 Labrador Sea: Inert gas sample collection

Jul 2001	Bermuda Atlantic Time-series Study #154: Gas sample collection and O ₂ analysis
Jan-Feb 2000	Kyodo North Pacific Ocean Time-series (KNOT) MR00-K01: Gas sample collection and O ₂ analysis; video recording of whitecap coverage
Nov 1999	Puget Sound student cruise: Test of whitecap video recording equipment
Feb 1995	Australia/Papua New Guinea: Coral sample and trace metal estuarine water collection
Apr 1994	Puget Sound student cruise: Winkler O ₂ titration training for undergraduate students
Jul 1992	North Pacific student cruise: Sediment core collection; alkalinity analysis

Presentations at Professional Conferences

- Gordon Research Conference on Chemical Oceanography (August, 2013) Biddeford, ME. Poster: *Through the looking glass: Water-column N₂/Ar as a tracer of benthic denitrification* **Hamme RC**, Emerson SR
- Line P Workshop (March 2013) Sidney, BC. Talk: *Denitrification in the Cascadia Basin* **Hamme RC**, Emerson SR
- From the Sediments to the Air-Sea Interface Workshop (November 2012) Seattle, WA. Talk: *N₂ excess in the deep ocean: Is it biology or physics?* **Hamme RC**, Emerson SR
- CFUW (Canadian Federation of University Women) Annual Meeting (June 2012) Victoria, BC. INVITED Talk: *Our changing ocean: The good, the bad, and the unknown* **Hamme RC**
- Saanich Inlet Symposium (May 2012) Sidney, BC. Talk: *Using the Saanich cycle to investigate the dynamics of redox changes* **Hamme RC**
- SOLAS Open Science Conference (May 2012) Cle Elum, WA. INVITED Talk: *Iron fertilization by volcanic ash: Implications for ocean carbon uptake* **Hamme RC**
- Line P Workshop (March 2012) Sidney, BC. Talk: *Using dissolved gases to quantify denitrification and productivity* **Hamme RC**
- AGU Ocean Sciences (February, 2012) Salt Lake City, UT. Talk: *Rapid changes in dissolved O₂/Ar in a Lagrangian tracer patch reveal a system far from steady-state* **Hamme RC**, Cassar N, Bender ML, Lance VP, Strutton PG, Sabine CL, Ho DT, Hargreaves BR
- CMOS Congress (June 2011) Victoria, BC. Talk: *Estimating marine nutrient loss from dissolved N₂/Ar measurements* **Hamme RC**, Emerson SR
- Line P Workshop (March 2011) Sidney, BC. Talk: *Dissolved gas sampling to constrain productivity and global denitrification* **Hamme RC**
- Line P Workshop (March 2010) Sidney, BC.
 Talk: *Comparing productivity methods on Line P: O₂/Ar with ¹³C and ¹⁵N incubations* Giesbrecht KE, **Hamme RC**, Emerson SR
 Talk: *Constraining uncertainties in the quantification of the Subarctic Pacific biological pump* **Hamme RC**, Tortell P
 Talk: *Volcanic ash fueled the August 2008 bloom event* **Hamme RC**, Webley PW, Crawford WR, Whitney FA, DeGrandpre MD, Emerson SR, Eriksen CC, Giesbrecht KE, Gower JFR, Kavanaugh MT, Peña MA, Sabine CL, Coogan LA, Batten SD, Lockwood D, Grundle DS
- AGU Ocean Sciences (February, 2010) Portland, OR.
 INVITED talk: *Natural volcanic iron fertilization of the Subarctic North Pacific* **Hamme RC**, Batten S, Coogan LA, Crawford WR, Dohan KB, Emerson SR, Eriksen CC, Giesbrecht KE, Gower JFR, Kavanaugh MT, Lockwood D, Sabine CL, Webley P, Whitney F
 Poster: *Net community production from O₂/Ar measurements in the Subarctic North Pacific* Giesbrecht KE, **Hamme RC**
 Poster: *Nitrous Oxide Production and Consumption in an Anoxic, Brackish Coastal Pond* Manning CC, Casciotti KL, Frame CH, **Hamme RC**
 Talk: *Noble gas supersaturations as tracers of diapycnal mixing in the ventilated thermocline of the North Pacific Ocean* Emerson SR, **Hamme RC**, Ito T
 Talk: *Modeling spatial and temporal variability of noble gas tracers in the North Pacific* Ito T, **Hamme RC**, Covert P, Emerson SR
- PICES Annual Meeting (October 2009) Jeju, Korea. Talk: *Natural volcanic iron fertilization of the Subarctic North Pacific* **Hamme RC**, Batten S, Crawford W, Dohan K, Emerson S, Giesbrecht K, Gower J, Kavanaugh M, Lockwood D, Sabine C, Whitney F. Talk given by W Crawford

International Carbon Dioxide Conference 8 (September, 2009) Jena, Germany. Poster: *Seasonal ocean heat fluxes and short-term variability from semi-continuous atmospheric Ar/N₂ measurements* **Hamme RC**, Blaine T, Keeling R, Paplawsky W

CO2 Experts Meeting 15 (September, 2009) Jena, Germany. Talk: *Refinement of atmospheric Ar/N₂ techniques: Implications for O₂/N₂ measurement* **Hamme RC**, Blaine T, Keeling RF, Paplawsky W, Rafelski L

Gordon Research Conference on Chemical Oceanography (August, 2009) Tilton, NH. Poster: *Widespread High-Productivity Event Observed in the Northeast Pacific, August 2008* **Hamme RC**, Batten S, Crawford W, Dohan K, Emerson S, Giesbrecht K, Gower J, Kavanaugh M, Lockwood D, Sabine C, Whitney F

GLOBEC Open Science Meeting (June, 2009) Victoria, BC Talk: *Widespread High-Productivity Event Observed in the Northeast Pacific, August 2008* **Hamme RC**, Batten S, Crawford W, Dohan K, Giesbrecht K, Gower J, Kavanaugh M, Lockwood D, Sabine C, Whitney F

Line P Workshop (March 2009) Sidney, BC. Talk: *Net community production at Station P from an oxygen/argon mass balance* Giesbrecht KE, **Hamme RC**, Emerson SR

AGU Fall Meeting (December, 2008) San Francisco, CA.
 Poster: *Low Net Community Production from Oxygen/Argon Mass Balance during the Southern Ocean Gas Exchange Experiment.* **Hamme RC**, Cassar N.
 Talk: *Ocean ventilation as a driver of interannual variability in atmospheric potential oxygen*, Keeling RF, **Hamme RC** (presenter).
 Poster: *Biological Productivity from an Oxygen Mass Balance in the subarctic North Pacific*, Giesbrecht K, **Hamme RC**.
 Poster: *Denitrification and Oxygen Cycling in Saanich Inlet*, Manning CC, **Hamme RC**, Bourbonnais A.

Line P Workshop (March 2008) Sidney, BC. Talk: *Biological productivity from the ONAr (oxygen / nitrogen / argon) gases* Giesbrecht KE, **Hamme RC**, Emerson SR

Gordon Research Conference on Chemical Oceanography (August, 2007) Tilton, NH.
 INVITED talk: *Studying water mass formation using noble gases (and an ignoble one)* **Hamme RC**

AGU Fall Meeting (December, 2006) San Francisco, CA. Talk: *Explaining observed variability in the interhemispheric gradient of atmospheric potential oxygen* **Hamme RC**, Keeling RF, Paplawsky WJ

Line-P Symposium (July 2006) Victoria, BC. Poster: *Measuring productivity and air-sea gas exchange with dissolved gases at the Hawaii Ocean Time-series* **Hamme RC**, Emerson SR

AGU Ocean Sciences (February 2006) Honolulu, HI.
 Poster: *A simple convection model demonstrates the importance of rapid cooling and bubbles in setting the concentration of gases in the deep ocean.* **Hamme RC**, Severinghaus JP.
 Poster: *Noble gases, air-sea gas exchange and diapycnal mixing in the subtropical North Pacific.* Stump C, Ito T, Deutsch C, Emerson SR, **Hamme RC**.

Comer Abrupt Climate Change Roundtable (October, 2005) Palisades, NY. Poster: *Interannual variability in Atmospheric Potential Oxygen from the Scripps atmospheric oxygen flask sampling network* **Hamme RC**, Keeling RF, Paplawsky WJ

Seventh International Carbon Dioxide Conference (September, 2005) Broomfield, CO.
 Poster: *Interannual variability in Atmospheric Potential Oxygen from the Scripps atmospheric oxygen flask sampling network.* **Hamme RC**, Keeling RF, Paplawsky WJ.
 Talk: *Global oceanic and land carbon sinks from the Scripps atmospheric oxygen flask sampling network.* Keeling, RF, Manning AC, **Hamme RC**, Paplawski WJ.

Gordon Research Conference on Chemical Oceanography (August, 2005) Tilton, NH. Poster: *Interannual variability in Atmospheric Potential Oxygen from the Scripps atmospheric oxygen flask sampling network.* **Hamme RC**, Keeling RF, Paplawsky WJ

Ocean Carbon and Climate Change (August, 2005) Woods Hole, MA. Poster: *Interannual variability in Atmospheric Potential Oxygen from the Scripps atmospheric oxygen flask sampling network* **Hamme RC**, Keeling RF, Paplawsky WJ

AGU Fall Meeting (December, 2004) San Francisco, CA.
 Poster: *Dissolved argon, krypton and xenon demonstrate the importance of rapid cooling in causing gas undersaturations in the deep ocean.* **Hamme RC**, Severinghaus JP, Emerson SR, Keeling RF.
 Poster: *Argon isotopes in seawater: Fractionation during air-water exchange and the $\delta^{40}\text{Ar}$ of seawater.* Emerson SR, Caillon N, **Hamme RC**, Severinghaus JP.

Comer Abrupt Climate Change Fellows Conference (April 2004) Palisades, NY. Poster: *Development of a new continuous atmospheric oxygen analysis method* **Hamme RC**, Keeling RF

AGU Ocean Sciences (January 2004) Portland, OR. Talk: *Air-sea gas flux from bubbles constrained by Ne and N₂/Ar measurements at station ALOHA* **Hamme RC**, Emerson SR

Gordon Research Conference on Chemical Oceanography (August, 2003) Tilton, NH. Poster: *Upper ocean cycles of oxygen and inert gases at station ALOHA* **Hamme RC**, Emerson SR

Surface Ocean Lower Atmosphere Study (SOLAS) summer school (July, 2003) Cargese, France. Poster & talk: *Upper ocean cycles of oxygen and inert gases at station ALOHA* **Hamme RC**, Emerson SR

AGU Fall Meeting (December, 2002) San Francisco, CA. Talk: *The effect of air/sea exchange and mixing on organic carbon export calculated from an oxygen mass balance* **Hamme RC**, Emerson SR

Dissertations in Chemical Oceanography (DISCO) XVII (May 2002) Honolulu, HI. Talk: *Mass balance of gases in the ocean: organic carbon production and deep-water formation processes* **Hamme RC**

AGU Ocean Sciences (February 2002) Honolulu, HI. Talk: *Control of inert gas saturations in the deep ocean by surface gas exchange processes* **Hamme RC**, Emerson SR

Gordon Research Conference on Chemical Oceanography (August, 2001) Tilton, NH. Poster: *Geochemistry of inert gases in the ocean* **Hamme RC**, Emerson SR

Gas Transfer at Water Surfaces IV (June 2000) Miami, FL. Poster: *Explaining gas undersaturations in deep water and at their source in high latitudes* **Hamme RC**, Emerson SR

Institutional Seminars

Princeton University: Environmental Geology & Geochemistry (February 2013) Princeton, NJ. *Nitrogen gas excess in the deep sea: Biology or physics?*

Woods Hole Oceanographic Institution: Marine Chemistry and Geochemistry (February 2013) Woods Hole, MA. *Nitrogen gas excess in the deep sea: Biology or physics?*

University of Washington: Chemical Oceanography (January 2013) Seattle, WA. *N₂/Ar in the deep sea: Water mass formation and denitrification.*

Dalhousie University: Oceanography (August 2012) Halifax, NS. *Estimating global ocean denitrification rates from the dissolved N₂/Ar ratio.*

University of Washington: Oceanography (May 2012) Seattle, WA. *Controls on ocean carbon.*

University of Victoria: Royal Society Fellows luncheon (Jan 2011) Victoria, BC. *Volcanic ash fuelled a massive plankton bloom, but did it lead to record salmon returns?* with Tim Parsons.

University of Maryland: Horn Point Laboratory (April 2010) Cambridge, MD. *Dissolved gases as tracers of water mass formation and transformation.*

Universität Hamburg: Institut für Geophysik (March 2010) Hamburg, Germany. *The ocean response to a volcanic iron fertilization event in the subarctic North Pacific AND Dissolved gases as tracers of water-mass formation and transformation.*

Institute of Ocean Sciences (October 2009) Sidney, BC. *Did natural iron fertilization by volcanic ash cause the August 2008 bloom event in the Subarctic North Pacific?*

Oregon State University: College of Oceanic and Atmospheric Sciences, Biogeochemistry (April 2009) Corvallis, OR. *Signatures of ocean ventilation in atmospheric oxygen.*

University of Washington: Chemical Oceanography (March 2009) Seattle, WA. *Signatures of ocean ventilation in atmospheric oxygen.*

Institute of Ocean Sciences (March 2009) Sidney, BC. *Signatures of ocean ventilation in atmospheric oxygen.*

University of Victoria: Topics in Atmospheres and Oceans (March 2009) Victoria, BC. *Signatures of ocean ventilation in atmospheric oxygen.*

University of Hawai'i at Mānoa: Department of Oceanography (January 2009) Honolulu, HI. *Dissolved gases as tracers of water mass formation and transformation.*

University of Victoria: School of Earth and Ocean Sciences Fireside Chat (January 2009) Victoria, BC. *An oceanographer ponders atmospheric gases: Tales from three years in the Keeling lab.*

University of Miami Rosenstiel School of Marine and Atmospheric Science: Marine Chemistry & Atmospheric Chemistry (Dec 2007) Miami, FL. *Studying water mass formation using noble gases (and an ignoble one).*

University of British Columbia: Earth and Ocean Sciences (Nov 2007) Vancouver, BC. *Studying water mass formation using noble gases (and an ignoble one).*

University of Victoria: Biogeochemistry Group (May 2007) Victoria, BC. *What can atmospheric oxygen tell us about ocean ventilation?*

Lamont-Doherty Earth Observatory (June 2005) Palisades, NY. *Dissolved gases: Tracers of deep-water formation and the carbon pumps.*

University of Victoria: School of Earth and Ocean Sciences (June 2005) Victoria, BC. *Inert gases: Tracers of deep-water formation and mixing.*

Scripps Institution of Oceanography: Physical Oceanography Research Division (May 2005) La Jolla, CA. *Tracer studies of deep-water formation and mixing.*

Worldwide Universities Network Videoconference Seminar (April 2005) multiple US and European locations. *The marine chemistry of gases: Tracers of physical and biological processes.* Joint with Steve Emerson

University of Rhode Island (March 2005) Narragansett, RI. *The effect of bubble dynamics and mixing on gases in the ocean: Implications for productivity measurements near Hawaii.*

Woods Hole Oceanographic Institution: Marine Chemistry and Geochemistry (February 2005) Woods Hole, MA. *The effect of bubble dynamics and mixing on gases in the ocean: Implications for productivity measurements near Hawaii.*

California Institute of Technology: Environmental Science and Engineering (October 2004) Pasadena, CA. *The effect of bubble dynamics and mixing on gases in the ocean: Implications for productivity measurements near Hawaii.*

Scripps Institution of Oceanography: Geosciences, Marine Chemistry, and Geochemistry (April 2004) La Jolla, CA. *The effect of bubble dynamics and mixing on dissolved gases: Implications for productivity measurements near Hawaii.*

Princeton University (April 2004) Princeton, NJ. *The effect of bubble dynamics and mixing on dissolved gases.*

University of Victoria: School of Earth and Ocean Sciences (March 2004) Victoria, BC. *The effect of bubble dynamics and mixing on dissolved gases.*

Oregon State University: Biogeochemical Oceanography (October 2003) Corvallis, OR. *Upper ocean cycles of oxygen and inert gases in the subtropical Pacific.*

Massachusetts Institute of Technology: Earth, Atmospheric and Planetary Sciences (April 2003) Boston, MA. *Inert gases as tracers of upper ocean processes.*

Pomona College: Chemistry (November 2002) Claremont, CA. *Using dissolved gases to measure ocean productivity: Implications for climate change.*

Scripps Institution of Oceanography (November 2002) La Jolla, CA. *Inert gases as tracers of upper ocean processes.*

Princeton University: Environmental Geosciences (September 2002) Princeton, NJ. *Inert gases as tracers of upper ocean processes.*

Woods Hole Oceanographic Institution: Marine Chemistry and Geochemistry (September 2002) Woods Hole, MA. *Inert gases as tracers of upper ocean processes.*

Lamont-Doherty Earth Observatory (September 2002) Palisades, NY. *Inert gases as tracers of upper ocean processes.*

Professional Organizations

American Geophysical Union (AGU), 1994-1996, 1998-present
Canadian Meteorological and Oceanographic Society (CMOS), 2009-present
The Oceanography Society (TOS), 2010-present
Geochemical Society, 2010-present