

Daniel C. Ohnemus

University of Georgia
Skidaway Institute of Oceanography
10 Ocean Science Drive
Savannah, GA 31411
dan@uga.edu
T. +1 912-598-2414

Education

Massachusetts Institute of Technology &
Woods Hole Oceanographic Institution

Ph.D., MIT/WHOI Joint Program in
Chemical Oceanography, Oct. 2013

Williams College

B.A., Biology and Chemistry, June 2004

Professional Experience

Sept 2018 – Present

Assistant Professor, University of Georgia,
Skidaway Institute of Oceanography, Dept of
Marine Sciences; Savannah GA

Feb 2014 – Aug 2018

Post-doctoral research scientist, Bigelow
Laboratory for Ocean Sciences, E. Boothbay ME;
Advisor: Benjamin S. Twining

Oct 2013 – Feb 2014

Post-doctoral researcher, Woods Hole
Oceanographic Institution (WHOI)

June 2008 – Oct 2013

Graduate student, MIT/WHOI Joint Program in
Oceanography; Advisor: Phoebe J. Lam

Jan-2006 – June 2008

Research assistant, Univ. of S. California and
WHOI, supervisor: James W. Moffett

Research Interests

Trace element marine biogeochemistry; interactions between marine organisms, non-living particulate phases, and the biological carbon pump; bioavailability and cycling of refractory lithogenic phases; modeling of marine particle concentrations, end-member compositions, and transformation rates.

Awards and Honors

- NSF Dissertations in Chemical Oceanography (DISCO XXIV), Lihue, Kaua'i, 2014
- Williams College Tyng Graduate Merit Fellowship, Sept 2000

Professional Affiliations

- The Oceanography Society, 2019-Present
- American Geophysical Union, 2009-Present
- American Society of Limnology and Oceanography, 2012-Present

Published Abstracts, Meeting Presentations, Invited Talks

- **Ohnemus, D.C.**, "Revealing Particle Dynamics, Scavenging, and Trace Metal Cycles in the GEOTRACES Era", invited talk, Florida State University, Oct. 2019.
- **Ohnemus, D.C.**, "Exposing Latent, Scavenged Particulate Phases in the Oceans", invited talk, Old Dominion University, Jan. 2019.
- **Ohnemus, D.C.**, Twining, B.S.: "Visualizing Particle Dynamics and Metal Remineralization in the GEOTRACES Era", invited talk, Gordon Research Conference, Chemical Oceanography, July 2017.
- **Ohnemus, D.C.**, Rauschenberg, S., Krause, J.W., Brzezinski, M.A., Baines, S.B., Collier, J.L, Twining, B.S.: Accumulation and speciation of Si by *Synechococcus*

- examined by single-cell synchrotron x-ray fluorescence and bulk x-ray spectroscopy; Poster presented at 2016 Ocean Sciences Meeting, New Orleans.
- **Ohnemus, D.C.**, Rauschenberg, S., Twining, B.S. Trace Element Composition of Phytoplankton Along the US GEOTRACES Pacific Zonal Transect: Comparing Single-Cell SXRF Quotas, Chemical Leaching, and Bulk Particle Digestion; Abstract #OS22B-08; talk presented at 2014 AGU Fall Meeting.
 - Dissertations Symposium in Chemical Oceanography (DISCO), talk presented Oct 2014.
 - **Ohnemus, D.C.**, Lam, P.J.: Significant Bioavailability of Lithogenic Particulate Fe: 57-Fe Uptake in Field Incubations. Poster at 2014 Ocean Sciences Meeting, Honolulu.
 - **Ohnemus, D.C.**, Lam, P.J., Shelley, R., Landing, W.M.: Lithogenic particulate tracers in the North Atlantic U.S. GEOTRACES section: inputs, scavenging, and biological uptake. Talk presented at ASLO 2013 Aquatic Sciences Meeting, New Orleans, Feb 2013.
 - Severmann, S., **Ohnemus, D.C.**, Lam, P.J.: The iron isotopic imprint of benthic iron release in suspended particles from the African oxygen minimum zone. Talk presented at Goldschmidt 2012, Montréal. June 2012.
 - **Ohnemus, D.C.** and Lam, P.J.: Trace element composition of size-fractionated particulates in the North Atlantic U.S. GEOTRACES section. Talk presented at Goldschmidt 2012, Montreal. June 2012.
 - **Ohnemus, D.C.** and Lam, P.J.: Trace element composition of size-fractionated particulates in the Mauritanian upwelling zone of the eastern North Atlantic U.S. GEOTRACES section. Talk at Goldschmidt 2011, Prague, Czech Republic. August 2011.
 - Lam, P.J., **Ohnemus, D.C.**, Marcus, M.A., Fakra, S.: Speciation and export of particulate iron from the Northwest African continental margin into the water column. AGU Fall Meeting, Portland OR, Sept. 2010.
 - **Ohnemus, D.C.**, Lam, P.J., Bishop, J.K.B.: The mini-MULVFS holder: A new 142mm filter holder design for particulate sampling from *in situ* pumps, EOS Trans. AGU, 91(26), Ocean Science Meeting 2010. Suppl. Abstract CO25B-05.

Papers in Refereed Journals and Books

- Tagliabue, A., Bowie, A.R., DeVries, T., Ellwood, M.J., Landing, W.M., Milne, A., **Ohnemus, D.C.**, Twining, B.S., Boyd, P.W., The interplay between regeneration and scavenging fluxes drives ocean iron cycling. *Nature Communications* 10, 4960 (2019) doi:10.1038/s41467-019-12775-5
- Meskhidze, N., Völker, C., Al-Abadleh, H.A., Barbeau, K., Bressac, M., Buck, C., Bundy, R.M. Croot, P., Feng, Y., Ito, A., Johansen, A.M., Landing, W.M., Mao, J., Myriokefalitakis, S., **Ohnemus, D.C.**, Pasquier, B., Ye, Y., Perspective on identifying and characterizing the processes controlling iron speciation and residence time at the atmosphere-ocean interface. *Marine Chemistry* (in press), 2019. doi:10.1016/j.marchem.2019.103704
- **Ohnemus, D.C.**, Torrie, R., & Twining, B.S. Exposing the distributions and elemental associations of scavenged particulate phases in the ocean using basin-scale multi-element data sets. *Global Biogeochemical Cycles*, 33(6), 725-748, 2019. doi: 10.1029/2018GB006145
- Hayes, C.T., Black, E.E., Anderson, R.F., Baskaran, M., Buesseler, K.O., Charette, M.A., Cheng, H., Cochran, J.K., Edwards, R.L., Fitzgerald, P., Lam, P.J., Lu, Y., Morris, S.O. **Ohnemus, D.C.**, Pavia, F.J., Stewart, G., Tang, Y., Flux of particulate

- elements in the north Atlantic ocean constrained by multiple radionuclides, *Global Biogeochem. Cycles*, 32 (2018) 1738–1758, doi: 10.1029/2018GB005994
- **Ohnemus, D.C.**, Krause, J.W., Brzezinski, M. A., Collier, J. L., Baines, S. B., Twining, B.S.: The chemical form of silicon in marine *Synechococcus*. *Marine Chemistry*, 201: 124-136, 2018. doi: 10.1016/j.marchem.2018.08.004
 - **Ohnemus, D.C.**, Lam, P.J., Twining, B.S.: Optical observation of particles and responses to particle composition in the GEOTRACES GP16 section, *Marine Chemistry*, 201: 124-136, 2018. doi:10.1016/j.marchem.2017.09.004
 - Schlitzer, R. **et al.**, The GEOTRACES Intermediate Data Product 2017, *Chemical Geology*, 493: 210-223, 2018. doi:10.1016/j.chemgeo.2018.05.040
 - Bourne, H., Bishop, J.K.B., Lam, P.J., **Ohnemus, D.C.**, Global Spatial and Temporal Variation of Cd:P in Euphotic Zone Particulates, *Global Biogeochemical Cycles*, 32, 1123-1141, 2018. doi:10.1029/2017GB005842
 - Hoffman, C., Nicholas, S., **Ohnemus, D.C.**, Fitzsimmons, J., Sherrell, R., German, C., Heller, M., Lee, J-M., Lam, P.J., Toner, B.M., Near-field iron and carbon chemistry of non-buoyant hydrothermal plume particles, Southern East Pacific Rise 15° S, *Marine Chemistry*, 201:183-197, 2018. doi: 10.1016/j.marchem.2018.01.011
 - Saito, M. A., Noble, A., Hawco, N. Twining, B.S., **Ohnemus, D.C.**, John, S.G., Lam, P.J., Conway, T.M., Johnson, R. Moran, D., McIlvin, M. The Acceleration of Dissolved Cobalt's Ecological Stoichiometry due to Biological Uptake, Remineralization, and Scavenging in the Atlantic Ocean. *Biogeosciences*, 14(20):4637–4662, doi:10.5194/bg-2016-511
 - Hawco, N. J., Lam, P.J., Lee, J.-M., **Ohnemus, D.C.**, Noble, A.E., Wyatt, N.J., Lohan, M.C., Saito, M.A.: 2017. Cobalt scavenging in the mesopelagic ocean and its influence on global mass balance: Synthesizing water column and sedimentary fluxes. *Marine Chemistry*, 201: 151-166, 2018. doi:10.1016/j.marchem.2017.09.001
 - Brzezinski, M. A., Krause, J.W., Baines, S. B., Collier, J. L., **Ohnemus, D. C.**, Twining, B. S.: Patterns and regulation of silicon accumulation in *Synechococcus* spp. *Journal of Phycology*, 53(4):746–761, 2017. doi:10.1111/jpy.12545
 - Krause, J. W., Brzezinski, M. A., Krause, J.W., Baines, S. B., Collier, J. L., Twining, B. S., **Ohnemus, D. C.** Picoplankton contribution to biogenic silica stocks and production rates in the Sargasso Sea. *Global Biogeochemical Cycles*, 31(5):762–774, 2017. doi:10.1002/2017GB005619
 - Noble, A. E., **Ohnemus, D.C.**, Hawco, N.J., Lam, P.J., Saito, M.A.: Coastal sources, sinks and strong organic complexation of dissolved cobalt within the US North Atlantic GEOTRACES transect GA03. *Biogeosciences*, 14(11):2715–2739, 2017. doi:10.5194/bg-14-2715-2017.
 - **Ohnemus, D.C.**, Rauschenberg, S., Cutter, G.A., Fitzsimmons, J.N., Sherrell, R.M., Twining, B.S., Elevated trace metal content of prokaryotic communities associated with marine oxygen deficient zones. *Limnology and Oceanography*, 62: 3-25, 2017. doi:10.1002/lno.10363
 - **Ohnemus, D.C.**, Rauschenberg, S., Krause, J.W., Brzezinski, M.A., Collier, J.L., Geraci-Yee, S., Baines, S.B., Twining, B.S.: Silicon content of individual cells of *Synechococcus* from the North Atlantic Ocean. *Marine Chemistry* (187), 2016. doi: 10.1016/j.marchem.2016.10.003
 - Hawco, N.J., **Ohnemus, D.C.**, Resing, J.A., Twining, B.S., Saito, M.A.: A cobalt plume in the oxygen minimum zone of the Eastern Tropical South Pacific. *Biogeosciences* (13), 5697-5717; 2016. doi:10.5194/bg-13-5697-2016
 - Kohut, J. T., Kustka, A.B., Hiscock, M.R., Lam, P.J., Measures, C.I., Milligan, A., White, A., Carvalho, F., Hatta, M., Jones, B.M., **Ohnemus, D.C.**, Swartz, J.M.

Mesoscale variability of the summer bloom over the northern Ross Sea shelf: A tale of two banks. *Journal of Marine Systems*, 166:50–60, 2017. doi:10.1016/j.jmarsys.2016.06.009.

- Hatta, M., Measures, C.I., Lam, P.J., **Ohnemus, D.C.**, Auro, M.E., Grand, M.M., Selph, K.E. The relative roles of modified circumpolar deep water and benthic sources in supplying iron to the recurrent phytoplankton blooms above Pennell and Mawson Banks, Ross Sea, Antarctica. *Journal of Marine Systems*, 166, 2016. doi:10.1016/j.jmarsys.2016.07.009.
- Anderson, R.F., Cheng, Hai, Fleisher, M., Hayes, C.T., Kadko, D., Lam, P.J., Landing, W., Lao, Y., Lu, Y., Measures, C., Moran, S.B., Morton, P., **Ohnemus, D.C.**, Shelley, R.: How well can we quantify dust deposition to the ocean? *Phil. Trans. R. Society A* (374), 2016. doi: 10.1098/rsta.2015.0285
- **Ohnemus, D.C.** and Lam, P.J.: Cycling of lithogenic marine particles in the US GEOTRACES North Atlantic transect. *Deep Sea Research Part II*, 116: 283-302, 2015. doi:10.1016/j.dsr2.2014.11.019
- Lam, P.J., **Ohnemus, D.C.**, Auro, M.E.: Size fractionated major particle composition and mass from the US GEOTRACES North Atlantic Zonal Transect. *Deep Sea Research Part II*, 116: 303-320, 2015. doi:10.1016/j.dsr2.2014.11.020
- Revels, B.N., **Ohnemus, D.C.**, Lam, P.J., Conway, T.M., John, S.G.: The isotopic signature and distribution of particulate iron in the North Atlantic Ocean. *Deep Sea Research Part II*, 116: 321-331, 2015. doi: 10.1016/j.dsr2.2014.12.004
- Noble, A.E., Echegoyen-Sanz, Y., Boyle, E.A., **Ohnemus, D.C.**, Lam, P.J., Kayser, R., Reuer, M., Wu, J., Smethie, W.: Dynamic variability of dissolved Pb and Pb isotope composition from the U.S. North Atlantic GEOTRACES Transect. *Deep Sea Research Part II*, 116: 208-225, 2015. doi: 10.1016/j.dsr2.2014.11.011
- Lamborg, C.H., Hammerschmidt, C.R., Bowman, K.L., Swarr, G.J., Munson, K.M., **Ohnemus, D.C.**, Lam, P.J., Heimbürger, L-E., Rijkenberg, M.J.A., Saito, M.A.: A global ocean anthropogenic mercury inventory based on water column measurements. *Nature*, 2014. doi:10.1038/nature13563
- Twining, B.S., Rauschenberg, S., Morton, P.L., **Ohnemus, D.C.**, Lam, P.J.: Comparison of particulate trace element concentrations in the North Atlantic Ocean as determined with discrete bottle sampling and in situ pumping. *Deep Sea Research Part II*. 2014.
- **Ohnemus, D.C.**, Auro, M.E., Sherrell, R.M., Lagerström, M., Morton, P.L., Twining, B.S., Rauschenberg, S., Lam, P.J.: Laboratory inter-comparison of marine particulate digests including Piranha: a novel chemical method for dissolution of polyethersulfone filters. *Limnology and Oceanography: Methods*, 12: 530-547. 2014. doi:10.4319/lom.2014.12.530
- Lam, P.J., **Ohnemus, D.C.** and Marcus, M.A.: The speciation of marine particulate iron adjacent to active and passive continental margins, *Geochimica et Cosmochimica Acta*, 80, 108–124, 2012. doi:10.1016/j.gca.2011.11.044
- Noble, A.E., Lamborg, C.H., **Ohnemus, D.C.**, Lam, P.J., Goepfert, T.J., Measures, C.I., Frame, C.H., Casciotti, K.L., DiTullio, G. R., Jennings, J. and Saito, M.A.: Basin-scale inputs of cobalt, iron, and manganese from the Benguela-Angola front to the South Atlantic Ocean, *Limnology and Oceanography*, 57(4), 989–1010, 2012. doi:10.4319/lo.2012.57.4.0989
- Thompson, R.B., Zeng, H.H., **Ohnemus, D.C.**, McCranor, B., Cramer, M., Moffett J.W.: Instrumentation for Fluorescence-Based Fiber Optic Biosensors. *Met. in Enzymology*, 450: 311-337, 2008.

Other Publications

- Twining, B.S., **Ohnemus, D.C.**, Torrie, R.L.: Trace metal uptake and remineralization and their impact on upper ocean stoichiometry. *In: Ocean Carbon Biogeochemistry (OCB) Newsletter*, July 2016.
- Lam, P.J., Bishop, J.K.B., Sherrell, R., Morris, P.J., Twining, B.S., Woods, T.J., **Ohnemus, D.C.**, Charrette, M.: In-situ pumping sampling protocols for particulate trace metals for GEOTRACES. *In: Sampling and Sample-handling Protocols for GEOTRACES Cruises*. Edited by the 2010 GEOTRACES Standards and Intercalibration Committee.

Funding

- U.S. National Science Foundation—NSFGEO-NERC: “Collaborative Research: Using Time-series Field Observations to Constrain an Ocean Iron Model”, 2018-09-01 to 2021-08-31, OCE 1829819 (co-PI), \$440,903
- U.S. National Science Foundation—NSF DBI: “FSML: Acquisition of a Raman Microscope at the Skidaway Institute of Oceanography”, DBI 1937671 (co-PI), \$207,500

Professional Activities

- UNOLS Operator Institution Representative (UGA Skidaway): 2019-Present
- Graduate Advisory Committee (UGA Dept. of Marine Sciences): 2019-Present
- Bigelow Laboratory for Ocean Sciences, Institution Safety Committee 2014-2016
- Woods Hole Oceanographic Institution, Institution Safety Committee 2009-2012
- Conference organizer: Graduate Climate Conference (GCC, 2011) Woods Hole Oceanographic Institution with 74 domestic and international attendees.
- Ad-hoc Reviewer: *Limnology and Oceanography*; *Limnology and Oceanography: Methods*; *Geophysical Research Letters*; *Phycologia*; *Deep Sea Research I and II*; *Marine Chemistry*, *Geochimica et Cosmochimica Acta*, *Chemical Geology*.

Teaching and Advising Experience

- Courses including: Global Biogeochemical Cycles, Chemical Oceanography, Synthesis Skills in Proposal-Writing and Review for Environmental Sciences
- Lecturer and Teaching Assistant: Biogeochemistry, Colby College Semester at Bigelow Laboratory.
- REU student: Renee L. Torrie (McGill Univ.), Jun-Aug 2016. Topic: “Modeling particulate behavior in GEOTRACES trace metal data”
- REU student: Brooke Stemple (UNC), Jun-Aug 2015. Topic: “Bioavailability of Iron Substrates to Diatoms”
- Field Teaching Assistant: Colby College Semester at Bigelow Laboratory. “Oceanographic Field Methods”, Fall 2015.

Cruise Experience

- BAIT: Bermuda Atlantic Iron Time Series, *R/V Atlantic Explorer*, Mar / May / Aug 2019; (21 d)
- Southern Ocean Time Series (SOTS), *R/V Investigator*, Mar 2018 (20 d)
- Iron in the California Coastal Current (IRON-BRU), *R/V Melville*, July 2014 (24 d)
- Equatorial Pacific / East Pacific Rise; US GEOTRACES East Pacific Zonal Transect, McLane pumps, *R/V Thompson*, Nov-Dec 2013 (57 days)
- Subantarctic Indian Ocean; Great Calcite Belt-II, McLane pumps and trace metal bottle incubations, *R/V Revelle*, Feb-Mar 2012 (35 days)

- North Atlantic; U.S. GEOTRACES N. Atlantic Zonal Transect-2, McLane pumps, *R/V Knorr*, Nov-Dec 2010 (36 days)
- Ross Sea, Southern Ocean; SEAFARERS cruise, *R/VIB N.B. Palmer*, McLane pumps and trace metal bottle incubations, Jan-Feb 2011 (28 days)
- North Atlantic; U.S. GEOTRACES N. Atlantic Zonal Transect-1, McLane pumps, *R/V Knorr*, Oct-Nov. 2010 (20 days)
- TENATSO Time Series at Cape Verde, CTD and McLane pumps, *R/V Islandia*, Mar. 2009 (3 days)
- Bermuda Atlantic Time Series, sediment traps, *R/V Atlantic Explorer*, Sept. 2008 (7 days)
- Arabian Sea, Indian Ocean; Arabian OMZ International Collaboration with NIO (Goa, India), *R/V Roger Revelle*, Trace metal CTD and shipboard FeLume analyses, Aug-Sept 2007 (26 days)
- Pacific Ocean; WP2 Pacific Ocean transect, *R/V Kilo Moana*, Trace metal CTD, Jan-Feb 2007 (39 days)

Skills and Analytical Techniques

Synchrotron-based elemental spectroscopy (XANES, EXAFS) and quantitative micro-fluorescence mapping (μ XRF); x-ray diffraction; clean, low-abundance trace metal analyses and laboratory method development; multi-element plasma mass spectrometry; marine particle collection (via McLane large volume marine sampling pumps, bottle filtrations, etc.); trace metal bottle incubations; transmissometry; large dataset management, visualization, and multifactor statistical analyses (PCA/EFA); 1-D and 2-D marine profile modeling. Software (selected): MATLAB, C++, R, Python, PERL, Seabird, JMP, Ocean Data View.

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