

Darren J. Pilcher

Research Scientist

Joint Institute for the Study of the Atmosphere and Ocean, University of Washington

NOAA Pacific Marine Environmental Laboratory

7600 Sand Point Way NE, OERD-3

Seattle, WA 98115

Phone: 206-526-6055

darren.pilcher@noaa.gov

Education:

- 2015 **University of Wisconsin-Madison** Madison, WI
Ph.D Atmospheric and Oceanic Science
Thesis: "Drivers of Large Lake and Marine Carbon Cycling: A Regional to Global Perspective"
Advisor: Galen A. McKinley
- 2010 **Beloit College** Beloit, WI
B.S. Chemistry major and history minor (*magna cum laude*)
Advisor: Laura Parmentier

Research and Professional Experience:

- 2017-present **Joint Institute for the Study of the Atmosphere and Ocean, University of Washington** Seattle, WA
Research Scientist
My research explores the physical and biogeochemical mechanisms of marine and freshwater carbon cycling. I'm particularly interested in how natural climate variability and anthropogenic climate change impact these mechanisms and the response of aquatic ecosystems. I'm also interested in how freshwater runoff impacts carbon cycling in coastal oceans and work towards developing links between the land and the ocean. I primarily employ regional and global models to address these topics, but work extensively with observational scientists.
- 2015-2017 **National Research Council** Seattle, WA
Postdoctoral Fellow
I was awarded a NRC postdoctoral fellowship to work with Jeremy Mathis at the NOAA Pacific Marine Environmental Laboratory. My project used high-resolution coastal modeling to assess the impact of glacial runoff on coastal carbon uptake and aragonite saturation state in the Gulf of Alaska.
- Summer 2014 **NCAR Advanced Study Program** Boulder, CO
Graduate Student Visitor
Participated in a funded three-month visiting student program to work with Dr. Keith Lindsay at NCAR. The project examined internal variability in surface

ocean $p\text{CO}_2$ on 10-30 year timeframes using output from the CESM Large Ensemble Experiment.

2010-2015 **University of Wisconsin-Madison** Madison, WI
Graduate Research Assistant

My graduate research focused on the physical and biological mechanisms that drive the carbon cycle in the Great Lakes and the global oceans. Specifically the interplay of these two processes in determining surface $p\text{CO}_2$ and regions of significant carbon uptake and efflux. To examine these issues, I utilized 3D physical numerical models coupled to NPZD ecosystem models. I also used Earth System Models to evaluate regions of large-scale spatial heterogeneity and internal variability in global ocean carbon uptake.

Summer 2009 **Leibniz Institute: IFM-GEOMAR** Kiel, Germany
DAAD RISE summer research intern

I worked on a project titled “The Improvement of a continuous equilibration device for the detection of trace greenhouse gases in seawater” under the guidance of a PhD student. The project consisted of field measurements and laboratory analysis via a continuous equilibration system and flame ionization detection (FID) and electron capture detection (ECD) gas chromatography.

Peer Reviewed Publications:

11. **Pilcher, D.J.**, S.A. Siedlecki, A. Hermann, K.O. Coyle, J.T. Mathis, and W. Evans, Simulated impact of glacial runoff on CO_2 uptake in the Gulf of Alaska, *Geophys. Res. Lett.*, submitted.
10. Siedlecki, S.A., **D.J. Pilcher**, A. Hermann, K. Coyle, and J.T. Mathis, The importance of freshwater to spatial variability of aragonite saturation state in the Gulf of Alaska *J. Geophys. Res. Oceans*, doi:10.1002/2017JC012791, in press.
9. **Pilcher, D.J.**, G.A. McKinley, J. Kralj, H. Bootsma, and E. Reavie (2017), Modeled sensitivity of Lake Michigan productivity and zooplankton to changing nutrient concentrations and quagga mussels, *J. Geophys. Res. Biogeosci.*, 122, doi:10.1002/2017JG003818.
8. McKinley, G.A., A.R. Fay, N. Lovenduski, and **D.J. Pilcher** (2017), Natural variability and anthropogenic trends in the ocean carbon sink, *Ann. Rev. Mar. Sci.* 9:9.1-9.26, doi:10.1146/annurev-marine-010816-060529.
7. Mouw, C.B., A. Barnett, G.A. McKinley, L. Gloege, and **D.J. Pilcher** (2016), Phytoplankton size impact on export flux in the global ocean, *Global Biogeochem. Cycles*, 30, doi:10.1002/2015GB005355.

6. Mouw, C.B., A. Barnett, G.A. McKinley, L. Gloege, and **D.J. Pilcher** (2016), Global ocean particulate organic carbon flux merged with satellite parameters, *Earth Sys. Sci. Data*, 8, 531-541, doi:10.5194/essd-8-531-2016.
5. Asch, R., **D.J. Pilcher**, S. Rivero-Calle, and J. Holding (2016), Demystifying models: Answers to Ten Common Questions that Ecologists Have about Earth System Models, *Limnol. Oceanogr. Bull.*, 25, 65-70, doi:10.1002/lob.10113.
4. McKinley, G.A., **D.J. Pilcher**, A.R. Fay K. Lindsay, M.C. Long, and N. Lovenduski (2016), Timescales for detection of trends in the ocean carbon sink, *Nature*, 530, 469-472, doi:10.1038/nature16958.
3. **Pilcher, D.J.**, S. Brody, L. Johnson, and B. Bronselaer (2015), Assessing the Abilities of CMIP5 Models to Represent the Seasonal Cycle of Surface Ocean $p\text{CO}_2$, *J. Geophys. Res. Oceans*, 120, doi:10.1002/2015JC010759.
2. **Pilcher, D.J.**, G.A. McKinley, H. Bootsma, and V. Bennington (2015), Physical and Biogeochemical Mechanisms of Internal Carbon Cycling in Lake Michigan, *J. Geophys. Res. Oceans*, 120, doi:10.1002/2014JC010594.
1. Phillips, J., G.A. McKinley, V. Bennington, H. Bootsma, **D.J. Pilcher**, R.W. Sterner, and N.R. Urban (2015), Evaluating the potential for CO_2 -induced acidification of the Laurentian Great Lakes, *Oceanography* 28(2), 136-145, doi:10.5670/oceanog.2015.37.

Publications in preparation:

1. **Pilcher, D.J.**, G.A. McKinley, K. Lindsay, M.C. Long, N. Lovenduski, Mechanisms of the forced trend in surface ocean $p\text{CO}_2$, *Global Biogeochem. Cycles*
2. **Pilcher, D.J.**, D.M. Naiman, J.N. Cross, A.J. Hermann, S.A. Siedlecki, G.A. Gibson, and J.T. Mathis, Natural and anthropogenic drivers of aragonite undersaturation in the Bering Sea, *Progress in Oceanography*
3. Butman, D., S. Stackpoole, **D.J. Pilcher**, R. Striegl, P. del Giorgio, Y. Prairie, P. Raymond, F. Paz Pellat, and J. Proyecto, Inland Water Carbon Cycling from Streams to Continents, *L&O Letters*

Non peer reviewed publications:

1. McKinley, G.A., N. Urban, V. Bennington, **D.J. Pilcher**, C. McDonald (2011), Preliminary Carbon Budgets for the Laurentian Great Lakes, *OCB News* 4 (2).

Honors and Awards:

- | | |
|------|--|
| 2017 | PICES Early Career Travel Grant for ESSAS 2017 Meeting |
| 2016 | Early Career Travel Grant for the OCB Summer Workshop |

2015-2017 National Research Council Postdoctoral Fellowship
 2014 Eco-DAS XI (Ecological Dissertations in the Aquatic Sciences), participant
 2013 NCAR ASP Summer Colloquium, “Carbon-climate connections in the Earth System, participant
 2012 Top three poster at Wisconsin Space Grant Consortium state conference
 2012 Anna Grant Birge Award
 2012-2013 Graduate Research Fellowship awarded by the Wisconsin Space Grant Consortium
 2011-2012 Dr. Laurel Salton Clark Memorial Graduate Fellowship awarded by the Wisconsin Space Grant Consortium
 2010 Chemistry departmental graduation honors
 2009 William J. Trautman Award for Physical Chemistry
 2008-2010 Ferwerda Merit Scholarship
 2007-2010 Midwest Conference Academic All-conference baseball
 2006-2010 Beloit College Presidential Scholar
 2006-2010 Beloit College Dean’s List

Teaching Experience:

Spring 2013 TA for AOS 332 Global Warming: Science and Impacts
 Fall 2012 TA for AOS 171 Global Change: Atmospheric Issues and Problems

Field Experience:

Sep. 2013 USGS Lake Michigan – R/V Lake Guardian
 Oct. 2011 CLIVAR A10 South Atlantic Ocean – Ronald Brown

Presentations:

Aug. 2017 **10th International Carbon Dioxide Conference**, Interlaken, Switzerland
 Poster, “Simulated impact of glacial runoff on CO₂ uptake and aragonite saturation state in the Gulf of Alaska”
 Jun. 2017 **ESSAS Open Science Meeting**, Tromso, Norway
 Talk, “Simulated impact of glacial runoff on CO₂ uptake and aragonite saturation state in the Gulf of Alaska”
 Apr. 2017 **University of Connecticut – Avery Point**, Groton, CT
 Talk (invited), “Simulated impact of glacial runoff on CO₂ uptake in the Gulf of Alaska”
 Dec. 2016 **AGU Fall Meeting**, San Francisco, CA
 Talk, “Simulated impact of high alkalinity glacial runoff on CO₂ uptake in the Coastal Gulf of Alaska”
 Jul. 2016 **OCB Summer Workshop**, Woods Hole, MA
 Poster, “Simulated impact of high alkalinity glacial runoff on CO₂ uptake in the Coastal Gulf of Alaska”
 Jun. 2016 **ASLO Summer Meeting**, Santa Fe, NM

- Talk, “Mechanistic Understanding of Lakewide Biogeochemical Cycles and Stressors in Lake Michigan Using Models”
- Mar. 2016 **UW Chemical Oceanography Seminar**, Seattle, WA
Talk, “Lake Michigan biogeochemical cycles and stressors”
- Feb. 2016 **AGU/ASLO/TOS Ocean Sciences Meeting**, New Orleans, LA
Poster, “Drivers of the Seasonal Carbon Cycle in the Coastal Gulf of Alaska”
- Oct. 2015 **Center for Limnology Fall Seminar Series**, Madison, WI
Talk, “Modeled sensitivity of Lake Michigan primary productivity and zooplankton to changing nutrient concentrations and quagga mussels”
- Apr. 2015 **AOS Colloquium Series**, Madison, WI
PhD defense, “Drivers of Large Lake and Marine Carbon Cycling: A Regional to Global Perspective”
- Mar. 2015 **CCR Climate Change Symposium**, Madison, WI
Poster, “Forced Trends and Internal Variability in Surface Ocean pCO₂: 1975-2036”
- Dec. 2014 **AGU Fall Meeting**, San Francisco, CA
Poster, “Forced Trends and Internal Variability in Surface Ocean pCO₂: 1975-2036”
- Dec. 2014 **CLIVAR/OCB Ocean’s Carbon and Heat Uptake**, San Francisco, CA
Poster, “Forced Trends and Internal Variability in Surface Ocean pCO₂: 1975-2036”
- Oct. 2014 **C-MORE Eco-DAS XI**, Honolulu, HI
Talk, “Integrating observations with general circulation models to resolve current issues in marine and large freshwater systems”
- Feb. 2014 **AGU/ASLO/TOS Ocean Sciences Meeting**, Honolulu, HI
Poster, “Physical Drivers of Lake Michigan Biogeochemistry”
- Feb. 2014 **AGU/ASLO/TOS Ocean Sciences Meeting**, Honolulu, HI
Co-author on poster, “Model metrics for the seasonal ocean pCO₂ cycle”
- Nov. 2013 **University of Wisconsin-Madison**, Madison, WI
Department seminar, “Modeled Seasonality of the Biogeochemistry of pre-*Dreissena* Lake Michigan”
- Aug. 2013 **NCAR ASP Key Uncertainties in the Global Carbon Cycle**, Boulder, CO
Poster, “Modeled Seasonality of the Biogeochemistry of Pre-*Dreissena* Mussel Lake Michigan”
- May 2013 **AOSS Community Poster Reception**, Madison, WI
Poster, “Modeled Seasonality of the Biogeochemistry of Pre-*Dreissena* Mussel Lake Michigan”
- Apr. 2013 **7th Annual Nelson Institute Earth Day Conference**, Madison, WI
Poster, “Modeled Seasonality of the Biogeochemistry of Pre-*Dreissena* Mussel Lake Michigan”
- Oct. 2012 **Great Midwestern Regional Space Grant Consortia**, Milwaukee, WI
Poster, “The Carbon and Nutrient Cycles of Lake Michigan”
- Aug. 2012 **22nd Annual Wisconsin Space Conference**, Whitewater, WI
Poster, “The Carbon and Nutrient Cycles of Lake Michigan”
- Jul. 2012 **IMBER ClimECO3 Summer School**, Ankara, Turkey
Poster, “The Carbon and Nutrient Cycles of Lake Michigan”

Nov. 2009 **Eight Annual Beloit International Symposium Day**, Beloit, WI
Talk, “Improvement of a Continuous Equilibration Method for Trace Gas
Analysis of Baltic Seawater at Kiel, Germany”

Additional Activities:

2017 Mentor for Danielle Naiman, a NOAA Hollings Scholar
2016-present Contributing author for the Inland Waters chapter of the 2nd State of the Carbon
Cycle (SOCCR-2).
2012-2015 Mentor for an undergraduate student James Kralj as part of his introductory
Biology 152 class and continuing on for independent research
2012-2013 Faculty liaison for Graduate Student Association
2012-2013 Graduate Student Association social committee
2010-2011 Graduate Student Association social committee

Reviewer:

Journal of Geophysical Research - Oceans, Geochemistry, Geophysics, Geosystems,
Geophysical Research Letters, Limnology and Oceanography, Nature, Nature Scientific Reports,
Water Resources Research