

## **Darren J. Pilcher**

NRC Postdoctoral Fellow

NOAA Pacific Marine Environmental Laboratory

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### **Education:**

**University of Wisconsin-Madison** Summer 2010-Summer 2015

Department of Atmospheric and Oceanic Science

1225 W. Dayton Street

Madison, WI 53706

Ph.D Atmospheric and Oceanic Science

Thesis title: "Drivers of Large Lake and Marine Carbon Cycling: A Regional to Global Perspective"

Advisor: Galen A. McKinley

**Beloit College** Fall 2006-May 2010

700 College Street

Beloit, WI 53511

B.S. Chemistry major and history minor

Advisor: Laura Parmentier

Magna cum laude, departmental honors

### **Research and Professional Experience:**

**National Research Council**

Summer 2015 to present

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 uses high-resolution coastal modeling to assess the impact of varying alkalinity freshwater inputs on coastal carbon uptake in the Gulf of Alaska. A second project uses a similar model to analyze present variability and future projections of pH and aragonite saturation in the Bering Sea.

**University of Wisconsin-Madison** Summer 2010 to Summer 2015

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.

**NCAR Visiting Student Program** May 2014 to Aug. 2014

Boulder, CO

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. While at NCAR, I was able to accomplish a significant portion of the analysis for future

publication and was able to interact with a number of leading scientists concerning ocean carbon cycling and internal variability in climate models.

**Leibniz Institute: IFM-GEOMAR** Summer 2009

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:**

**Pilcher, D.J.**, G.A. McKinley, J. Kralj, and E. Reavie Modeled sensitivity of Lake Michigan productivity and zooplankton to changing nutrient concentrations and quagga mussels, *J. Geophys. Res. Biogeosciences*, in review.

**Pilcher, D.J.**, S.A. Siedlecki, A. Hermann, K.O. Coyle, J.T. Mathis, and W. Evans, Simulated impact of high alkalinity glacial runoff on CO<sub>2</sub> uptake in the Coastal Gulf of Alaska, *Geophys. Res. Lett.*, in review.

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*, in review.

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.

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.

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.

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.

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.

**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 pCO<sub>2</sub>, *J. Geophys. Res. Oceans*, 120, doi:10.1002/2015JC010759.

**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.

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<sub>2</sub>-induced acidification of the Laurentian Great Lakes, *Oceanography* 28(2), 136-145, doi:10.5670/oceanog.2015.37.

#### **Publications in preparation:**

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*, in prep

**Pilcher, D.J.**, G.A. McKinley, K. Lindsay, M.C. Long, N. Lovenduski, Mechanisms of the forced trend in surface ocean pCO<sub>2</sub>, *Global Biogeochem. Cycles*, in prep

#### **Non peer reviewed publications:**

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:**

2016	Early Career Travel Grant for the OCB Summer Workshop
2015-present	National Research Council Postdoctoral Fellowship
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
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

#### **Presentations:**

Dec. 2016	<b>AGU Fall Meeting</b> , San Francisco, CA Talk, "Simulated impact of high alkalinity glacial runoff on CO <sub>2</sub> uptake in the Coastal Gulf of Alaska"
Jul. 2016	<b>OCB Summer Workshop</b> , Woods Hole, MA Poster, "Simulated impact of high alkalinity glacial runoff on CO <sub>2</sub> uptake in the Coastal Gulf of Alaska"
Jun. 2016	<b>ASLO Summer Meeting</b> , Santa Fe, NM Talk, "Mechanistic Understanding of Lakewide Biogeochemical Cycles and Stressors in Lake Michigan Using Models"
Mar. 2016	<b>UW Chemical Oceanography Seminar</b> , Seattle, WA Talk, "Lake Michigan biogeochemical cycles and stressors"
Feb. 2016	<b>AGU/ASLO/TOS Ocean Sciences Meeting</b> , New Orleans, LA

- Oct. 2015 Poster, “Drivers of the Seasonal Carbon Cycle in the Coastal Gulf of Alaska”  
**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 pCO<sub>2</sub>: 1975-2036”
- Dec. 2014 **AGU Fall Meeting**, San Francisco, CA  
Poster, “Forced Trends and Internal Variability in Surface Ocean pCO<sub>2</sub>: 1975-2036”
- Dec. 2014 **CLIVAR/OCB Ocean’s Carbon and Heat Uptake**, San Francisco, CA  
Poster, “Forced Trends and Internal Variability in Surface Ocean pCO<sub>2</sub>: 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 pCO<sub>2</sub> 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 **7<sup>th</sup> 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 **22<sup>nd</sup> 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”

### 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

**Additional Activities:**

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  
2006-2010      Pitcher on the Beloit College varsity baseball team

**Reviewer:**

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