

Matthew B. Alkire, Ph.D.

Senior Oceanographer
Polar Science Center
Applied Physics Laboratory • University of Washington
1013 NE 40th Street • Seattle, WA 98105
Mobile: (201) 370-8426 • Office: (206) 897-1623
Email: malkire@apl.washington.edu

EDUCATION

- Ph.D. Oceanography (2010), Oregon State University. Dissertation: *Freshwater Contributions and their Variability to the Surface and Halocline Layers of the Arctic and Subarctic seas*. Advisor: Dr. Kelly Falkner.
- M.S. Chemical Oceanography (2005), Florida Institute of Technology. Thesis: *Using Geochemical Tracers to Infer Flow Pathways and Mixing of Two Alaskan Arctic River Plumes Under Ice*. Advisor: Dr. John Trefry.
- B.S. Marine Science (2003), Richard Stockton College of New Jersey, *magna cum laude*. Minors in chemistry and mathematics. Advisor: Dr. Gordon Grguric.

EMPLOYMENT

- Senior Oceanographer (2011-present), Polar Science Center, Applied Physics Laboratory, University of Washington, Seattle, WA
- Postdoctoral Research Associate (2010-2011), Applied Physics Laboratory, University of Washington, Seattle, WA
- Teaching Assistant (2009-2010), College of Oceanic & Atmospheric Sciences, Oregon State University, Corvallis, OR
- Research Assistant (2006-2009), College of Oceanic & Atmospheric Sciences, Oregon State University, Corvallis, OR
- Research Assistant (2004-2005), Department of Marine & Environmental Systems, Florida Institute of Technology, Melbourne, FL
- Teaching Assistant (2003-2004), Department of Marine & Environmental Systems, Florida Institute of Technology, Melbourne, FL

AWARDS, GRANTS, and FELLOWSHIPS

- Changes of heat and freshwater budgets in the East Siberian Sea and southern Makarov Basin contributing to multidisciplinary changes in the Pacific Arctic (2015-2017), National Oceanic & Atmospheric Administration COM-Arctic Research Program, Grant NA15OAR4310156. Award: \$170,739

- Collaborative Research: Assessing the Impact of Small, Canadian Arctic River Flows (SCARFs) to the Freshwater Budget of the Canadian Arctic Archipelago (2013-2018), National Science Foundation, Grant PLR-1303766. Award: \$593,283
- Collaborative Research: Eurasian and Makarov Basins Observational Network Targets Changes in the Arctic Ocean (2012-2018), National Science Foundation, Grant PLR-1203146 AM003. Award: \$669,901
- Using sea ice cores to investigate the influence of glacial meltwater in surface waters of Kongsfjorden (2012-2013), U.S.-Norway Fulbright Foundation for Educational Exchange, Host Institution: The University Centre in Svalbard. Amount: 87,000 NOK (approx. \$15,100 USD)
- Eagle Scout (2000), Boy Scouts of America, Troop 1, Carlstadt, NJ

PROJECTS & FIELD WORK

- Assessing the impact of small, Canadian Arctic river flows (SCARFs) to the freshwater budget of the Canadian Archipelago (2013-2018), Principal investigator.
- Eurasian and Makarov Basins Observational Network Targets Changes in the Arctic Ocean (2012-2018), co-Principal investigator.
- North Pole Environmental Observatory (2006-2015), Ph.D. student (2006-2010) and co-Principal investigator (2011-2015).
- The Freshwater Switchyard of the Arctic Ocean (2012), Field work participant.
- North Atlantic Bloom Experiment (2010-2011), Postdoctoral research associate.
- Arctic Synoptic Basin-wide Oceanography project (2006-2009), Laboratory analyst.
- Equatorial Pacific Iron Speciation (2005), Cruise participant.
- Continuation of Arctic Nearshore Impact Monitoring in Development Area, Program Tasks 3 and 4, Prudhoe Bay, Alaska (2004-2005), M.S. student.
- Port Valdez, AK Sediment Coring Program (2004), M.S. Student.

SKILLS

- *Laboratory*: Isotope dilution and mass spectrometry (barium and stable oxygen isotope analyses), titrations (dissolved oxygen, total alkalinity, and chlorinity), and colorimetry (nutrients)
- *Instrumentation*: Seabird, Satlantic, WET Labs, Sontek, Guideline, and Metrohm instruments including CTDs, salinometers, biogeochemical sensors (dissolved oxygen, nitrate, backscatter, beam attenuation, turbidity, and chlorophyll fluorescence), and titrators

- *Computing*: PC and Macintosh operating systems, MATLAB, Ocean Data View, Microsoft Office Suite

SYNERGISTIC ACTIVITIES

- Associate Editor (2016-present), Deep-Sea Research I
- Member (2016-present), Principal Investigator Council, Polar Science Center, Applied Physics Laboratory
- Science Communication Fellow (2011-2016), Pacific Science Center, Seattle, WA
- Proposal reviewer (2013-present), National Science Foundation
- Journal reviewer (2007-present), Journal of Geophysical Research, Progress in Oceanography, Continental Shelf Research, Deep-Sea Research, Journal of Oceanography, Polar Research
- Member (2003-present), American Geophysical Union

PUBLICATIONS

Submitted and in preparation

- Pnyushkov, A.V., I.V. Polyakov, R. Rember, V. Ivanov, M.B. Alkire, I. Ashik, T. Baumann, G.V. Alekseev, and A. Sundfjord (2017). Heat, salt, and mass transports in the eastern Eurasian Basin of the Arctic Ocean from two years of mooring observations, *Deep-Sea Research I*, in review.
- Baumann, T.M., I.V. Polyakov, A. Pnyushkov, R. Rember, I. Goszczko, M. Alkire, V. Ivanov, and E. Carmack (2017). Evidence for three distinct hydrographic seasonal cycles at the continental slope of the eastern Eurasian Basin of the Arctic Ocean, *Journal of Physical Oceanography*, in review.
- Alkire, M.B., A. Jacobson, G.O. Lehn, and R.W. Macdonald (2017). A geochemical survey of estuaries across the Canadian Arctic Archipelago, manuscript in preparation.

Peer-reviewed publications

- Alkire, M.B., J. Morison, A. Schweiger, J. Zhang, M. Steele, C. Peralta-Ferriz, and S. Dickinson (2017). A meteoric water budget for the Arctic Ocean, *Journal of Geophysical Research*, doi:10.1002/2017JC012807.
- Alkire, M.B., I. Polyakov, R. Rember, I.M. Ashik, V. Ivanov, and A.V. Pnyushkov (2017). Lower halocline water formation and modification, a comparison of physical and geochemical methods, *Ocean Sci. Discuss.*, <https://doi.org/10.5194/os-2017-55>, accepted.
- Polyakov, I.V., A.V. Pnyushkov, M. Alkire, I.M. Ashik, T. Baumann, E.C. Carmack, I. Goszczko, J. Guthrie, V.V. Ivanov, T. Kanzow, R. Krishfield, R.

- Kwok, A. Sundfjord, J. Morison, R. Rember, and A. Yulin (2017). Greater role for Atlantic inflows on sea-ice loss in the Eurasian Basin of the Arctic Ocean, *Science*, doi:10.1126/science.aai8204.
- Alkire, M.B., A. Jacobson, G.O. Lehn, R.W. Macdonald, and M.W. Rossi (2017). On the geochemical heterogeneity of rivers draining into the straits and channels of the Canadian Arctic Archipelago, *Journal of Geophysical Research Biogeosciences*, doi:10.1002/2016JG003723.
 - Alkire, M.B., J. Morison, and R. Andersen (2015). Variability in the meteoric water, sea-ice melt, and Pacific water contributions to the central Arctic Ocean, 2000-2014, *Journal of Geophysical Research* 120, 1573-1598, doi:10.1002/2014JC010023.
 - Alkire, M.B., F. Nilsen, E. Falck, J. Søreide, and T. Gabrielsen (2015). Tracing sources of freshwater contributions to first-year sea ice in Svalbard fjords, *Continental Shelf Research* 101, 85-97.
 - Alkire, M.B., E. D'Asaro, C. Lee, M.J. Perry, I. Cetinic, N. Briggs, and A. Gray (2014). Net community production and export from Seaglider measurements in the North Atlantic after the spring bloom, *Journal of Geophysical Research* 119, doi:10.1002/2014JC010105.
 - Jackson, J.M., C. Lique, M. Alkire, M. Steele, C.M. Lee, W.M. Smethie, and P. Schlosser (2014). On the waters upstream of Nares Strait, Arctic Ocean, from 1991 to 2012, *Continental Shelf Research* 73, 83-96.
 - Morison, J., R. Kwok, C. Peralta-Ferriz, M. Alkire, I. Rigor, R. Andersen, and M. Steele (2012). Changing Arctic Ocean freshwater pathways, *Nature* 481, doi:10.1038/nature10705.
 - Alkire, M.B., E. D'Asaro, C. Lee, M.J. Perry, A. Gray, I. Cetinic, N. Briggs, E. Rehm, E. Kallin, J. Kaiser, and A. Gonzalez-Posada (2012). Estimates of net community production and export using high-resolution, Lagrangian measurements of O₂, NO₃⁻, and POC through the evolution of a spring diatom bloom in the North Atlantic, *Deep-Sea Research I* 64, 157-174.
 - Alkire, M.B., K.K. Falkner, J. Morison, R.W. Collier, C.K. Guay, R.A. Desiderio, I.G. Rigor, and M. McPhee (2010). Sensor-based profiles of the NO parameter in the central Arctic and southern Canada Basin: new insights regarding the cold halocline, *Deep-Sea Research I* 57, 1432-1443.
 - Alkire, M.B., K.K. Falkner, T. Boyd, and R.W. Macdonald (2010). Sea-ice melt and meteoric water distributions in Nares Strait, Baffin Bay, and the Canadian Arctic archipelago, *Journal of Marine Research* 68(6), 767-798.
 - McPhee, M., J. Morison, A. Proshutinsky, M. Steele, and M. Alkire (2009). Rapid change in freshwater content of the Arctic Ocean, *Geophysical Research Letters* 36, doi:10.1029/2009GL037525.
 - Abrahamsen, E.P., M.P. Meredith, K.K. Falkner, S. Torres-Valdes, M.J. Leng, M.B. Alkire, S. Bacon, I. Polyakov, V. Ivanov, and S. Kirillov (2009). Tracer-

derived freshwater budget of the Siberian continental shelf and slope following the extreme Arctic summer of 2007, *Geophysical Research Letters* 36, doi:10.1029/2009GL037341.

- Alkire, M.B., K.K. Falkner, I. Rigor, M. Steele, and J. Morison (2007). The return of Pacific waters to the upper layers of the central Arctic Ocean, *Deep-Sea Research I* 54, 1509-1529.
- Alkire, M.B., and J.H. Trefry (2006). Transport of spring floodwater from rivers under ice to the Alaskan Beaufort Sea, *Journal of Geophysical Research* 111, doi:10.1029/2005JC003446.

Popular articles

- Morison, J., J. Wilkinson, M. Alkire, F. Nilsen, I. Polyakov, W. Smethie Jr, P. Schlosser, F. Vivier, A. Lourenco, C. Provost, J. Pelon, C. Peralta Ferriz, M. Karcher, B. Rabe, C. Lee (2017). The North Pole Region as an Indicator of the Changing Arctic Ocean: The Need for Sustaining Observations, *Arctic*, in press.
- Alkire, M.B., A. D. Jacobson, G.O Lehn, and R.W. Macdonald (2015). Small rivers could have big impact on Arctic Ocean, *Eos* 96, doi:10.1029/2015EO034005.
- Alkire, M.B., M.J. Perry, E. D'Asaro, and C.M. Lee (2013). Using sensor-based, geochemical measurements from autonomous platforms to estimate biological production and export of carbon during the 2008 North Atlantic spring bloom, *Ocean Carbon and Biogeochemistry News* 6(2), 1-6.

Selected Abstracts

- Alkire, M.B., A. Jacobson, G. Lehn, R. Macdonald, and M. Rossi (2016). Geochemical heterogeneity of rivers draining the Canadian Arctic Archipelago, *Eos*, Trans. AGU, Fall Meet. Suppl., Abstract B13C-0577.
- (INVITED) Alkire, M.B., J. Morison, and I. Rigor (2014). Connecting changes in the inventories of Pacific water, meteoric water, and sea ice melt in the central Arctic and Fram Strait, 1998-2011, *Eos*, Trans. AGU, Ocean Sci. Meet. Suppl., Abstract ID 13657.
- Alkire, M.B., E. D'Asaro, C. Lee, M.J. Perry, A. Gray, I. Cetinic, N. Briggs, E. Rehm, J. Kaiser, and A. Gonzalez-Posada (2012). Estimates of net community production and export via Lagrangian measurements of O₂, NO₃, and POC through the evolution of a spring bloom, *Eos*, Trans. AGU, Ocean Sci. Meet. Suppl., Abstract S085-9644.
- Alkire, M.B., K.K. Falkner, J. Morison, R.A. Desiderio, C. Guay, R.W. Collier, and M. McPhee (2010). The First Sensor-Based Measurements of the NO Parameter in the Arctic Ocean, *Eos*, Trans. AGU, 91(26), Ocean Sci. Meet. Suppl., Abstract PO45C-11.
- Alkire, M.B., K.K. Falkner, R.W. Collier, J. Morison, and C. Guay (2008). River runoff is the dominant source of freshwater to the central Arctic Ocean and

Beaufort Sea during spring 2008, Eos. Trans. AGU, 89(53), Fall Meet. Suppl., Abstract C51A-0523.

- Alkire, M.B., K.K. Falkner, R.W. Collier, R. Desiderio, R. Andersen, and J. Morison (2008). The use of continuous profiles of oxygen and nitrate to assess the sources of halocline waters in the central Arctic Ocean, Eos. Trans. AGU, Ocean Sci. Meet. Suppl., Abstract 034-2027.
- Alkire, M.B., K.K. Falkner, R.W. Collier, R. Desiderio, R. Andersen, and J. Morison (2008). Investigating halocline water ventilation in the central Arctic Ocean using high-resolution O₂ and NO₃ measurements, Scientific Committee on Antarctic Research/International Arctic Science Committee, International Polar Year Open Science Conference, St. Petersburg, Russia.