

DR. JANNES KOELLING

Research Interests

I am an observational oceanographer who is interested in how physical processes in the ocean influence biogeochemical cycling of elements such as carbon, oxygen, and nutrients. The focus of my current research is on the large-scale controls of the oxygen cycle, particularly in ventilation regions such as the North Atlantic ocean.

Skills and Competencies

Coding and technology

Proficient in MATLAB, python (xarray, pandas, keras/Tensorflow), GitHub

Scientific Writing

Published four first-author publications with a total of 82 citations to date, and several co-author publications (full list below)

Proposal Writing

Acquired funding through graduate and postdoctoral fellowships (list below); recently wrote and submitted first NSF proposal

Research dissemination

Regularly presented at major conferences; several invited talks and seminars; participation in school outreach and media

Cruise experience and Fieldwork

Experienced with mooring deployment and calibration, CTD casts/water sampling over 150 days at sea (detailed list below)

Mentoring

Co-mentored undergraduate and graduate students (list below)

Employment

University of Washington & NOAA PMEL

September 2023 – present

CICOES Postdoctoral Scholar

Seattle, WA, USA

Investigating oxygen ventilation of the deep ocean in deep water formation regions using BGC-Argo floats

Supervisors: Dr. Gregory Johnson, Dr. Andrea Fassbender & Dr. Alison Gray

Dalhousie University

2022 – 2023

Postdoctoral Researcher

Halifax, NS, Canada

Working on studying oxygen budgets in the Labrador Sea, and on analyzing Waveglider measurements of oxygen, pCO₂, and pH during a hurricane

Supervisor: Dr. Douglas Wallace

Dalhousie University

2020 – 2022

Postdoctoral Research Fellow at Ocean Frontier Institute

Halifax, NS, Canada

Studying seasonal and interannual variability of oxygen export from the Labrador Sea using mooring data

Main supervisor: Dr. Douglas Wallace

Host supervisors: Dr. Johannes Karstensen (GEOMAR, Germany) and Dr. Pascale Lherminier (Ifremer, France)

Education

Scripps Institution of Oceanography | University of California, San Diego

2013 – 2020

Ph.D. in Oceanography

La Jolla, CA, USA

Dissertation title: “Variability in formation, properties, and transport of North Atlantic Deep Water“

Supervisor: Dr. Uwe Send

Jacobs University

2010 – 2013

B.Sc. in Earth and Space Sciences

Bremen, Germany

Thesis title: “Erosion of bacterial mats in a gas hydrate field as a function of flow speed“

Supervisor: Dr. Laurenz Thomsen

Publications and Media

1. **Koelling, J.**, Fassbender, A.J., Gray, A., Johnson, G.C. and Sharp, J. (2024). Progressive oxygenation of the North Atlantic subpolar gyre. *submitted to Journal of Geophysical Research: Oceans*.
<https://doi.org/10.22541/essoar.172926706.63693481/v1>
2. Miller, U.K., Fogaren, K., Atamanchuk, D., Johnson, C., **Koelling, J.**, Le Bras, I., Lindeman, M. Nagao, H., Nicholson, D.P., Palevsky, H., Park, E., Yoder, M. and Palter, J. (2024). Oxygen optodes on oceanographic moorings: recommendations for deployment and in-situ calibration. *Frontiers in Marine Science*.
<https://doi.org/10.3389/fmars.2024.1441976>
3. **Koelling, J.**, Atamanchuk, D., Karstensen, J., and Wallace, D. W.R. (2023). Decadal variability of oxygen uptake, export, and storage in the Labrador Sea from observations and CMIP6 models. *Frontiers in Marine Science*.
<https://doi.org/10.3389/fmars.2023.1202299>
4. **Koelling, J.**, Atamanchuk, D., Karstensen, J., Handmann, P., and Wallace, D. W.R. (2022). Oxygen export to the deep ocean following Labrador Sea Water formation. *Biogeosciences*.
<http://doi.org/10.5194/bg-19-437-2022>
 - Research featured on CBC, YouTube channel “SciShow“ and over 90 news publications (2022)
 - Radio interview with German station “Deutschlandfunk” (2022)
 - Interview for AGU EOS magazine (2022)
5. Atamanchuk, D., Palter, J., Palevsky, H., Le Bras, I., **Koelling, J.** and Nicholson, D., 2022. Linking oxygen and carbon uptake with the meridional overturning circulation using a transport mooring array. *Oceanography*.
<https://doi.org/10.5670/oceanog.2021.supplement.02-03>
6. **Koelling, J.**, Send, U., and Lankhorst, M. (2020). Decadal Strengthening of Interior Flow of North Atlantic Deep Water Observed by GRACE Satellites, *Journal of Geophysical Research: Oceans*.
<http://doi.org/10.1029/2020JC016217>
7. Atamanchuk, D., **Koelling, J.**, Send, U., and Wallace, D.W.R. (2020): Rapid transfer of oxygen to the deep ocean mediated by bubbles, *Nature Geoscience*.
<http://doi.org/10.1038/s41561-020-0532-2>
8. Frajka-Williams, E., et al., 2019. Atlantic meridional overturning circulation: Observed transport and variability. *Frontiers in Marine Science*.
<https://doi.org/10.3389/fmars.2019.00260>
9. Anutaliya, A., Send, U., Sprintall, J., McClean, J.L., Lankhorst, M. and **Koelling, J.**, 2019. Mooring and seafloor pressure end point measurements at the southern entrance of the Solomon Sea: Subseasonal to interannual flow variability. *Journal of Geophysical Research: Oceans*.
<https://doi.org/10.1029/2019JC015157>
10. Frajka-Williams, E., Lankhorst, M., **Koelling, J.** and Send, U., 2018. Coherent circulation changes in the Deep North Atlantic from 16 N and 26 N transport arrays. *Journal of Geophysical Research: Oceans*.
<https://doi.org/10.1029/2018JC013949>
11. **Koelling, J.**, Wallace, D. W. R., Send, U., and Karstensen, J. (2017). Intense oceanic uptake of oxygen during 2014–2015 winter convection in the Labrador Sea, *Geophysical Research Letters*.
<http://doi.org/10.1002/2017GL073933>
12. Turk, D., Dowd, M., Lauvset, S.K., **Koelling, J.**, Alonso-Perez, F. and Perez, F.F., 2017. Can empirical algorithms successfully estimate aragonite saturation state in the subpolar North Atlantic?. *Frontiers in Marine Science*.
<https://doi.org/10.3389/fmars.2017.00385>

Awards

Roger Daley Postdoctoral Publication Award

2023

Awarded by Canadian Meteorological and Oceanographic Society (CMOS) for Koelling et al. (2022) paper

President’s List for Academic Excellence, Jacobs University

2011/2012 and 2012/2013

Grants and Fellowships

Data Science Postdoctoral Fellowship Awarded by the University of Washington eScience Institute	2024–2025
CICOES Postdoctoral Fellowship "Quantifying the uptake of oxygen in the subpolar North Atlantic and its export to the deep ocean"	2023–2025
Ocean Frontier Institute International Postdoctoral Fellowship "Seasonal and interannual variability of oxygen export from the Labrador Sea"	2020–2022
Ocean Frontier Institute Visiting International Researcher Fellowship "Studying the impact of lateral exchanges on carbon, oxygen, and nitrate budgets in the Labrador Sea"	2019
NASA Earth and Space Sciences Fellowship "Using GRACE Satellite Data to Investigate Variability in Deep Ocean Transports"	2016 – 2019

Teaching & Mentoring

Mentor for CICOES summer undergraduate intern, University of Washington (I. Jaguzny) Project title: "The effect of El Niño on ocean biogeochemistry and air-sea fluxes of oxygen"	2024
Co-mentor for visiting summer graduate student, Dalhousie University (L. Moseley) Project title: "Using Data-Constrained Modeling to Examine the Drivers of Central Labrador Sea Oxygen Variability"	2023
Co-mentor for undergraduate student, Dalhousie University (S. Wong) "Measurements of Ocean Biogeochemistry and Air-Sea Exchanges on the Scotian Shelf from a Wave Glider in 2022"	2023
Guest lecturer for Advanced Chemical Oceanography course, Dalhousie University Lecture on use of mass balance approaches to quantify Net Community Production	2023
Earth and Space Sciences Teaching Assistant, Jacobs University Hosting help desk for first-year undergraduate level Oceanography, Geosciences, and Space Science courses	2012 – 2013

Outreach

University of Washington outreach event Science demonstration to high school students from underrepresented communities through Seattle MESA	2024
Adopt-A-Float school visit Science talk and demonstration at Ocean Research College Academy (high school)	2024
Jacobs University school visit Demonstration of underwater robot to middle school students	2012

Service

Session chair, Ocean Sciences Meeting "Physical Transport and Biogeochemical Cycling in the Subpolar North Atlantic"	2024
Reviewer for scientific journals including Geophysical Research Letters, J. Physical Oceanography, Nature Communications, Nature Climate Change, JGR: Oceans, PNAS	2018-2024

Invited talks

IOC-UNESCO global ocean oxygen network (GO2NE) webinar (virtual) "On the Decadal variability of oxygen uptake, export, and storage in the Labrador Sea"	2023
University of Washington Banse Early Career Scientist seminar "The lungs of the ocean: oxygen uptake and export in the subpolar North Atlantic"	2023
Dalhousie University Oceanography seminar "Variability in oxygen uptake, storage, and export in the Labrador Sea"	2023
OSNAP fall workshop (virtual) "The oxygen budget in the Labrador Sea and its variability"	2022
European Geophysical Union (EGU) General Assembly - solicited speaker "Ventilation and oxygen export in the Labrador Sea"	2022

Dalhousie University Oceanography seminar (virtual)	2021
“Export of newly oxygenated Labrador Sea Water following convection“	
Woods Hole Oceanographic Institution Physical Oceanography seminar (virtual)	2020
“Decadal changes in NADW circulation revealed by GRACE satellite measurements“	
Cruise experience	
NOAAS Ronald H Brown, RB-19-07	Dec 19 – Dec 24, 2019
St Thomas, US Virgin Islands – Bridgetown, Barbados	Tropical Atlantic
Chief scientist; cruise objective to acoustically download data and attempt to recover broken mooring	
NOAAS Pisces, PC-18-03	May 30 – June 21, 2018
Jacksonville, FL – Morehead City, NC	Tropical Atlantic
CTD watch, water sampling, acoustic telemetry, data download, processing and analysis	
RV Sikuliaq, SKQ201606S	May 13 – May 18, 2016
San Diego, CA – San Diego, CA	California Current
CTD watch, data analysis, mooring work	
RV Endeavor, EN573	January 25 – February 13, 2016
Narragansett, RI – San Juan, PR	Tropical Atlantic
CTD watch, acoustic telemetry, data download, processing, and analysis, mooring work	
RV Atlantis, AT26-30	March 8 – March 26, 2015
Punta Arenas, Chile – Montevideo, Uruguay	Argentine Basin
CTD watch, acoustic telemetry, data download and processing, mooring work	
RV Knorr	September 7 – September 27, 2014
Reykjavik, Iceland – Woods Hole, MA	Irminger Sea
CTD watch, acoustic telemetry, Argo float deployments, mooring work	
RV Melville, MV1309	July 15 – July 30, 2013
Seattle, WA – Seattle, WA	North Pacific
CTD watch, data processing and analysis, mooring work	
FS Polarstern, ARK-XXVII/1-2	June 14 – July 30, 2012
Bremerhaven, Germany – Tromsø, Norway	Arctic Ocean
CTD watch and water sampling	