

CURRICULUM VITAE

Nicole S. Lovenduski

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Education

Ph.D. Atmospheric and Oceanic Sciences, University of California at Los Angeles, 2007.

M.S. Atmospheric and Oceanic Sciences, University of California at Los Angeles, 2003.

B.A. Earth and Planetary Sciences, Washington University in St. Louis, 2001.

Professional Experience

Interim Director, Institute of Arctic and Alpine Research, University of Colorado Boulder, 2023-2024.

Associate Professor, Department of Atmospheric and Oceanic Sciences, University of Colorado Boulder, 2019-present.

Senior Fellow, Institute of Arctic and Alpine Research, University of Colorado Boulder, 2019-present.

Assistant Professor, Department of Atmospheric and Oceanic Sciences, University of Colorado Boulder, 2010-2019.

Fellow, Institute of Arctic and Alpine Research, University of Colorado Boulder, 2010-2019.

Postdoctoral Research Fellow, Department of Atmospheric Science, Colorado State University, 2007-2009.

Graduate Student Researcher, Institute of Geophysics and Planetary Physics, Univ. of California, Los Angeles, 2002-2007.

Fellowships and Awards

Provost's Faculty Achievement Award for Tenured Faculty, University of Colorado Boulder, 2023.

Ocean Sciences Early Career Award, American Geophysical Union, 2019.

Kavli Frontiers of Science Fellow, National Academy of Sciences, 2018.

National Science Foundation Faculty Early Career Development (CAREER) Award, 2018-2023.

Citation for Excellence in Refereeing by the American Geophysical Union (Geophysical Research Letters), 2015.

Citation for Excellence in Refereeing by the American Geophysical Union (Global Biogeochemical Cycles), 2012.

NOAA Climate and Global Change Postdoctoral Fellowship, 2007-2009.

Bjerknes Memorial Award (outstanding research by a graduate student), UCLA, 2006.

NASA Graduate Student Fellowship in Earth System Science, 2005-2007.

Brian Lance Bosart Memorial Award (outstanding service by a graduate student), UCLA, 2004.

Eugene Cota Robles Fellowship, University of California, 2001.

Funded Proposals*As lead PI*

Lovenduski, N. S., and L. Xia, 2023-2026: The cascading impacts of postnuclear ultraviolet radiation on photosynthesizers in the Earth System, Future of Life Institute, \$494,534 total award.

Lovenduski, N. S., and A. R. Gray, 2021-2024: Tracking carbon dioxide in the Southern Ocean. *DOE Biological and Environmental Research*, \$673,947 total award.

Lovenduski, N. S., 2018-2023: CAREER: A change in the forecast: Ocean biogeochemistry over the next decade. *NSF Chemical Oceanography*, \$799,914 total award.

Lovenduski, N. S., and G. A. McKinley, 2016-2021: Collaborative Research: Uncertainty in predictions of 21st century ocean biogeochemical change. *NSF Chemical Oceanography*, \$602,655 total award.

Lovenduski, N. S., 2012-2017: The variable and changing carbonate chemistry of the Southern Ocean. *NSF Chemical Oceanography*, \$453,752 total award.

Lovenduski, N. S., and C. Sweeney, 2012-2017: Drake Passage as a test bed for large-scale changes in Southern Ocean biogeochemistry. *NOAA Climate Program*, \$475,933 total award.

As co-PI

Pozo Buil, M., N. S. Lovenduski, E. DiLorenzo, M. G. Jacox, E. L. Hazen, and S. J. Bograd, 2020-2023: Mechanisms of interannual- to decadal-scale predictability for ocean physics and biogeochemistry in the California Current System. *NOAA Climate Variability and Predictability*, \$863,201 total award.

Tabor, C., C. Bardeen, S. Mitra, C. S. Harrison, J. C. Sepulveda, N. S. Lovenduski, and K. MacLeod, 2020-2023: Collaborative Research: Evaluating climate change and kill mechanisms associated with the end-Cretaceous mass extinction. *NSF Frontier Research in Earth Sciences*, \$2,443,911 total award.

Robock, A., O. B. Toon, et al., including N. Lovenduski, 2020-2023: Modeling urban fuel loads and the climatic effects of nuclear wars. *Open Philanthropy Project*, \$3,000,000 total award.

McKinley, G. A., N. S. Lovenduski, and M. C. Long, 2020-2022: Collaborative Research: Forced drivers of trends in ocean biogeochemistry: Volcanos and atmospheric carbon dioxide. *NSF Chemical Oceanography*, \$605,356 total award.

Hamlington, P. E., K. E. Niemeyer, and N. S. Lovenduski, 2019-2022: Collaborative Research: Submesoscale-resolving large eddy simulations using reduced biogeochemical models. *NSF Physical and Chemical Oceanography*, \$532,546 total award.

Robock, A., O. B. Toon, et al., including N. Lovenduski, 2017-2021: Environmental and human impacts of nuclear war. *Open Philanthropy Project*, \$2,298,206 total award.

Munro, D. R., N. S. Lovenduski, C. Sweeney, and B. B. Stephens, 2016-2020: Collaborative Research: Investigating biogeochemical fluxes and linkages to climate change with multi-scale observations in the Drake Passage. *NSF Antarctic Ocean and Atmospheric Sciences*, \$506,825 total award.

Hamlington, P. E., B. Fox-Kemper, and N. S. Lovenduski, 2013-2017: Collaborative Research: Reacting Tracers in a Turbulent Mixed Layer. *NSF Physical Oceanography*, \$671,973 total award.

McKinley, G. A., and N. S. Lovenduski, 2011-2014: The impact of thermocline induction on decadal variability of the North Atlantic carbon sink. *NASA Carbon Cycle Science*, \$447,125 total award.

Internally funded

Lovenduski, N. S., and J. E. Kay, 2022-2023: Cloudy chlorophyll: Emulating satellite retrieval in an Earth system model. *University of Colorado Boulder Research and Innovation Seed Grant Program*, \$50,000 total award.

Selected Invited Talks

NOAA Geophysical Fluid Dynamics Laboratory, Princeton, NJ (remotely), January 2023.

4th Carbon from Space Workshop, Frascati, Italy (remotely), October 2022.

US CLIVAR Workshop on Societally-Relevant Multi-Year Climate Predictions, Boulder, CO, March 2022.

AGU Fall Meeting, Session B037 and Session INV005, San Francisco, CA (remotely), December 2020.

AGU Fall Meeting, Session B039, San Francisco, CA, December 2019.

North Pacific Marine Science Organization (PICES) Annual Meeting, Victoria, BC, Canada, October 2019.

National Science Foundation Frontiers of Ocean Sciences Symposium, Washington, DC, June 2019.

Institute at Brown for Environment and Society, Brown University, Providence, RI, November 2018.

Lamont-Doherty Earth Observatory, Columbia University, Palisades, NY, October 2018.

Program on Climate Change Summer Institute, University of Washington, Friday Harbor, WA, September 2018.

The Effects of Climate Change on the World's Oceans Symposium, Washington, DC, June 2018.

EGU General Assembly, Session OS1.7, Vienna, Austria, April 2017.

Department of Marine and Coastal Sciences, Rutgers University, New Brunswick, NJ, March 2017.

Department of Earth and Planetary Sciences, Johns Hopkins University, Baltimore, MD, February 2017.

AGU Fall Meeting, Session 7745, San Francisco, CA, December 2015.

US CLIVAR/OCB Workshop on Ocean's Carbon and Heat Uptake, San Francisco, CA, December 2014.

Department of Atmospheric and Oceanic Sciences, University of Wisconsin, Madison, WI, April 2014.

AGU Ocean Sciences Meeting, Session 175E, Honolulu, HI, February 2014.

Department of Global Ecology, Stanford University, Stanford, CA, October 2013.

NCAR ASP Workshop on Key Uncertainties in the Global Carbon Cycle, Boulder, CO, August 2013.

Ocean Carbon and Biogeochemistry Summer Workshop, Woods Hole, MA, July 2013.

CLIVAR/CliC/SCAR Southern Ocean Region Implementation Panel Meeting, Boulder, CO, October 2011.

Ocean Carbon and Biogeochemistry Summer Workshop, Woods Hole, MA, July 2011.

Program on Climate Change, University of Washington, Seattle, WA, December 2010.

CLIVAR/CliC/SCAR Southern Ocean Region Implementation Panel Meeting, Southampton, England, June 2010.

AGU Ocean Sciences Meeting, Session IT54D, Portland, OR, February 2010.

New Frontiers in Southern Ocean Biogeochemistry and Ecosystem Research Workshop, Princeton, NJ, June 2009.

Division of Earth and Ocean Sciences, Duke University, Durham, NC, March 2009.

School of Earth and Atmospheric Sciences, Georgia Institute of Technology, Atlanta, GA, March 2009.

Dept. of Atmos. and Oceanic Sci. & Inst. of Arctic and Alpine Res., University of Colorado, Boulder, CO, March 2009.

AGU Fall Meeting, Session PP44B, San Francisco, CA, December 2008.

Rosenstiel School of Marine and Atmospheric Science, University of Miami, Miami, FL, November 2008.

GEOMAR Helmholtz Centre for Ocean Research, Kiel, Germany, October 2008.

Institute of Biogeochemistry and Pollutant Dynamics, ETH, Zurich, Switzerland, October 2008.

NASA Jet Propulsion Laboratory, Pasadena, CA, October 2008.

Department of Environmental Science and Engineering, California Institute of Technology, Pasadena, CA, October 2008.

Lamont-Doherty Earth Observatory, Columbia University, Palisades, NY, July 2008.

Gordon Research Conference on Polar Marine Sciences, Ventura, CA, March 2007.

Dynamics and Impacts of the Southern Annular Mode Workshop, Adelaide, Australia, February 2007.

Teaching Experience

Courses Taught, CU Boulder

FYSM 1000: Controversies and Revolutions in the Earth Sciences (F'20)

A first-year seminar course that explores the scientific process

ATOC 1060: Our Changing Environment (S'12, F'16, F'18)

An introductory course about Earth's changing climate that enrolls primarily non-science majors

ATOC/GEOL 3070: Introduction to Oceanography (F'10, F'11)

A synthesis of physical, chemical, and biological oceanography that enrolls primarily non-science majors

ATOC 4200/5200: Biogeochemical Oceanography (F'12, S'14, S'15, S'16, S'17, S'18, S'19, S'21, S'22, S'23)

An upper division undergraduate and graduate core course

ATOC 5300: The Global Carbon Cycle (S'11, F'13, F'15, F'17, F'19, F'21)

An advanced graduate course describing ocean, terrestrial, and atmospheric carbon reservoirs

Postdoctoral researchers advised, CU Boulder

Joshua Coupe, 2023-2024

David Munro, 2012-2016

Cara Nissen, 2022-2024

Graduate students advised, CU Boulder

Riley Brady, Ph.D. 2021, Atmospheric and Oceanic Sciences

Genevieve Clow, Ph.D. in progress, Atmospheric and Oceanic Sciences

Christopher Conrad, M.S. 2014, Atmospheric and Oceanic Sciences

Geneviève Elsworth, Ph.D. 2022, Geological Sciences

Natalie Freeman, Ph.D. 2017, Atmospheric and Oceanic Sciences

Tessa Gorte, Ph.D. 2023, Atmospheric and Oceanic Sciences (adopted in summer 2022)

Kristen Krumhardt, Ph.D. 2018, Environmental Studies

Samuel Mogen, Ph.D. in progress, Atmospheric and Oceanic Sciences

Holly Olivarez, Ph.D. in progress, Environmental Studies

Graduate student committees, member, CU Boulder

Scott Bachman, Ph.D. 2013, Atmospheric and Oceanic Sciences
Chloe Brashear, M.S. 2021, Geological Sciences
Sebastian Cantarero, Ph.D. 2022, Geological Sciences
Whitney Doss, Ph.D. 2014, Geological Sciences
Alice DuVivier, Ph.D. 2015, Atmospheric and Oceanic Sciences
Matthew Gentry, M.S. 2020, Atmospheric and Oceanic Sciences
Robert Kelleher, Ph.D. in progress, Geological Sciences
Jessica Kenigson, Ph.D. 2018, Atmospheric and Oceanic Sciences
Shelley Knuth, Ph.D. 2014, Atmospheric and Oceanic Sciences
Colin Lindsay, Ph.D. 2016, Geological Sciences
Mary McGuinn, Ph.D. in progress, Mechanical Engineering
Cole Persch, Ph.D. in progress, Atmospheric and Oceanic Sciences
Katherine Smith, Ph.D. 2017, Mechanical Engineering
Zephyr Sylvester, Ph.D. in progress, Environmental Studies
Fei Xing, Ph.D. 2015, Geological Sciences
Stephen Yeager, Ph.D. 2013, Atmospheric and Oceanic Sciences
Emily Zakem, M.S. 2011, Environmental Studies

Graduate student committees, member, external to CU Boulder

Daniel Jones, Ph.D. 2013, Atmospheric Science, Colorado State University
Madeleine Youngs, Ph.D. 2020, Earth, Atmospheric and Planetary Sciences, Massachusetts Institute of Technology

Undergraduate students advised, CU Boulder

Marvin Alfaro, Summer Multicultural Access to Research Training (SMART) mentee, 2010
Gabriela Cazares, Significant Opportunities in Atmospheric Research and Science (SOARS) mentee, 2019
Katherine Chan, Summer Multicultural Access to Research Training (SMART) mentee, 2016
Allysa Dallmann, Significant Opportunities in Atmospheric Research and Science (SOARS) mentee, 2021
Shana Egan, Research Experiences in Solid Earth Sciences for Students (RESESS) mentee, 2021.
David Feagins, Summer Multicultural Access to Research Training (SMART) mentee, 2019
Natalie Freeman, Summer Multicultural Access to Research Training (SMART) mentee, 2011
Will Geiken, summer undergraduate research intern, 2014
Luise Gleason, Research Experiences in Solid Earth Sciences for Students (RESESS) mentee, 2023
Joe Gradone, B.A. 2016, Geological Sciences Honors Program
Brianna Green, Research Experiences in Solid Earth Science for Students (RESESS) mentee, 2019

Isis Guadalupe-Díaz, Summer Multicultural Access to Research Training (SMART) mentee, 2020
 Nahir Guadalupe-Díaz, Atmospheric and Oceanic Sciences REU mentee, 2021
 Jaime Herriott, Atmospheric and Oceanic Sciences REU mentee, 2022
 Adelia Johnson, Research Experiences in Solid Earth Science for Students (RESESS) mentee, 2018
 Michelle MacLennan, Undergraduate Research Opportunities Program (UROP), 2017
 Andrew Margolin, B.A. 2012, Chemistry and Biochemistry Honors Program
 Leslie Montoya, Research Experiences in Solid Earth Science for Students (RESESS) mentee, 2016
 Gabriela Negrete-García, Significant Opportunities in Atmospheric Research and Science (SOARS) mentee, 2017-2018
 Holly Olivarez, Significant Opportunities in Atmospheric Research and Science (SOARS) mentee, 2018-2019
 Zoraida Pérez-Delgado, Significant Opportunities in Atmospheric Research and Science (SOARS) mentee, 2014
 Valeria Pérez Rivera, Summer Multicultural Access to Research Training (SMART) mentee, 2022
 Reema Shinh, Summer Multicultural Access to Research Training (SMART) mentee, 2021
 Katherine Shrader, Atmospheric and Oceanic Sciences REU mentee, 2023

Academic Service

External

Member, [Committee for the Independent Study on Potential Environmental Effects of Nuclear War](#), National Academies of Sciences, Engineering and Medicine, 2023-2024.

Member, Research Focus Group on Marine Heatwaves in the Global Ocean, Climate Variability and Predictability Program, 2023-2024.

Member, Ocean Acidification Research for Sustainability Working Group, United Nations, 2022-2023.

Advisory Council Member, US Polar Science Early Career Community Office, 2022-present.

Contributing Author, Intergovernmental Panel on Climate Change, Working Group I, Sixth Assessment Report, 2018-2021.

- Chapter 1: “Framing, context, methods”
- Chapter 5: “Global carbon and other biogeochemical cycles and feedbacks”

Editor, Current Climate Change Reports, Carbon cycle section, 2018-2020.

Member, Scientific Steering Committee, NCAR Community Earth System Model, 2019-2025.

Member, OCB Working Group on Filling the Gaps in Observation-based Estimates of Air-sea Carbon Fluxes, 2020-2022.

Member, US CLIVAR Working Group on Large Initial Condition Earth System Model Ensembles, 2018-2021.

Convener, Ocean Sciences Meeting, The evolving ocean carbon sink: Processes and impacts, 2020.

Convener, Ocean Sciences Meeting, Near-term prediction of the ocean: Physics, biogeochemistry, and ecosystems, 2020.

Convener, Ocean Sciences Meeting, Ensemble modeling approaches in physical and chemical oceanography, 2018.

Convener, AGU Fall Meeting, Recent advances in ocean biogeochemical observations and modeling, 2016.

Convener, Ocean Sciences Meeting, How do the carbon pumps pump?, 2016.

Member, Ocean Carbon and Biogeochemistry (OCB) Scientific Steering Committee, 2015-2017.

Member, CLIVAR/CliC/SCAR Southern Ocean Region Implementation Panel, 2010-2014.

Member, US CLIVAR - OCB Working Group on Oceanic Carbon Uptake in the CMIP5 models, 2012-2014.

Core Leader, SCAR Ocean Acidification Action Group, 2011-2015.

Member, American Meteorological Society Polar Meteorology and Oceanography Committee, 2010-2015.

Convener, Ocean Sciences Meeting, Mechanisms of biogeochemical variability in the global oceans, 2014.

Steering Committee, IPY-Oslo Science Conference, Theme 1: Linkages between polar regions and global systems, 2010.

Convener, IPY-Oslo Science Conference, The role of the polar oceans in global carbon cycling and acidification, 2010.

Steering Committee, New Frontiers in Southern Ocean Biogeochemistry and Ecosystem Research Workshop, 2009.

Convener, AGU Fall Meeting, Ocean Carbon Cycle: Decadal Trends in the Global Ocean, Session OS24, 2008.

Reviewer: Biogeosciences, Climate Dynamics, Deep-Sea Research II, Earth System Dynamics, Geophysical Research Letters, Global Biogeochemical Cycles, Journal of Climate, Journal of Geophysical Research - Oceans, Nature, Physics Today, Remote Sensing of Environment, Science.

Panelist: National Oceanographic and Atmospheric Administration, National Science Foundation.

Internal

Interim Director, Institute of Arctic and Alpine Research, 2023-2024.

Director of Graduate Studies, Department of Atmospheric and Oceanic Sciences, 2020-2023.

Executive Committee, Department of Atmospheric and Oceanic Sciences, 2020-2023.

Chair, Justice, Equity, Diversity, and Inclusion (JEDI) Task Force, Institute of Arctic and Alpine Research, 2021-2022.

Executive Committee, Institute of Arctic and Alpine Research, 2019-2023.

Examinations Committee, Dept. Atmos. and Ocean. Sci., 2019.

Colloquium Committee, Dept. Atmos. and Ocean. Sci., 2019.

Advisory Committee, Campus and Workplace Culture Survey - Institutes, University of Colorado Boulder, 2019.

Personnel Committee, Institute of Arctic and Alpine Research, 2019.

Director Search Committee, Institute of Arctic and Alpine Research, 2018-2019.

Faculty Search Committee, Oceanography, Dept. Atmos. and Ocean. Sci., 2017-2018.

Faculty Search Committee, Atmospheric Observations, Dept. Atmos. and Ocean. Sci., 2016-2017.

Chair, ATOC Distinguished Lecturer Committee, Dept. Atmos. and Ocean. Sci., 2016-2018.

UCAR Member Representative, University of Colorado Boulder, 2014-2022.

Faculty Search Committee, Climate Modeling, Dept. Atmos. and Ocean. Sci, Inst. Arctic and Alpine Res., 2013-2014.

Undergraduate Minor Advisor, Department of Atmospheric and Oceanic Sciences, 2012-2013.

Program Director, Graduate Certificate in Oceanography, 2011-2012.

Chair Nomination Committee, Department of Atmospheric and Oceanic Sciences, 2011.

Admissions Committee, Department of Atmospheric and Oceanic Sciences, 2010-2012.

Website Committee, Institute of Arctic and Alpine Research, 2010-2014.

Community

Speaker, The COVID pandemic and carbon in the ocean, Frasier Meadows Senior Living Complex, Boulder, CO, 2022.

Speaker, Measuring Chemicals in the Ocean, Manaugh Elementary School, Cortez, CO, 2021.

Mentor, Atmospheric and Oceanic Sciences Research Experiences for Undergraduates Program, CU Boulder, 2021-2023.

Mentor, Summer Multicultural Access to Research Training Program, CU Boulder, 2010, 2011, 2016, 2019-2022.

Mentor, Significant Opportunities in Atmospheric Research and Science Program, NCAR, 2014, 2017, 2018, 2019, 2021, 2023.

Mentor, Research Experiences in Solid Earth Science for Students, UNAVCO, 2016, 2018, 2019, 2021, 2023.

Speaker, Measuring Chemicals in the Ocean, High Peaks Elementary School, Boulder, CO, 2020.

Guest Speaker, Ocean Acidification, Radio 1190 News Hour, Boulder/Denver, CO, 2019.

Guest, Climate Change and Coral Reefs podcast, Fort Collins High School, Fort Collins, CO, 2019.

Mentor, Mentoring Physical Oceanography Women to Increase Retention Program, 2017-2019.

Panelist, Insights into career planning and preparedness, NCAR Advanced Study Program, Boulder, CO, 2016.

Speaker, Climate Change and Ocean Acidification, Boulder Country Day School (K-8), Boulder, CO, 2015.

Guest Speaker and Panelist, Ocean acidification, Colorado Ocean Coalition, Boulder, CO, 2011.

Panelist, Career Paths in Polar Research, Association of Polar Early Career Scientists, Boston, MA, 2011.

Guest, Marine Science podcast, St. Mary's High School, Englewood, CO, 2010.

Panelist, Career Paths in Atmospheric and Oceanic Sciences, University of Colorado, Boulder, CO, 2010.

Speaker, The science and ethics of global warming, Trinity Lutheran Church, Boulder, CO, 2010.

PUBLICATIONS

¹ Indicates student author in Lovenduski group

² Indicates post-doctoral author in Lovenduski group

* These authors contributed equally to this work

In Review / Revision

83. ²Nissen, C., N. S. Lovenduski, M. Maltrud, A. R. Gray, Y. Takano, K. Falcinelli, J. Sauvé, and K. M. Smith, in review: Using synthetic float capabilities in E3SMv2 to assess spatio-temporal variability in ocean physics and biogeochemistry. *Geoscientific Model Development*, doi:10.5194/gmd-2023-220.

In Press

82. ¹Olivarez, H. C., N. S. Lovenduski, Y. Eddebbar, A. R. Fay, G. A. McKinley, M. Levy, and M. C. Long, in press: How does the Pinatubo eruption influence our understanding of long-term changes in ocean biogeochemistry? *Geophysical Research Letters*, doi:10.1029/2023GL105431.
81. ¹Clow, G. L., N. S. Lovenduski, M. Levy, K. Lindsay, and J. E. Kay, in press: The utility of simulated ocean chlorophyll observations: a case study with the Chlorophyll Observation Simulator Package (version 1) in CESMv2.2. *Geoscientific Model Development*, doi:10.5194/gmd-2023-143.
80. Kern, S., M. E. McGuinn, K. M. Smith, N. Pinardi, K. E. Niemeier, N. S. Lovenduski, and P. E. Hamlington, in press: Computationally efficient parameter estimation for high-dimensional ocean biogeochemical models. *Geoscientific Model Development*, doi:10.5194/gmd-2023-107.

2024

79. ²Nissen, C., N. S. Lovenduski, C. Brooks, M. Hoppema, R. Timmermann, and J. Hauck, 2024: Severe 21st-century ocean acidification in Antarctic Marine Protected Areas. *Nature Communications*, 15, 259, doi:10.1038/s41467-023-44438-x
- Press release: [Acidity of Antarctic waters could double by century's end, threatening biodiversity](#)
 - *Newsweek*: [Penguins in Peril as Acidity of Antarctic Waters Set to Double by 2100](#)

2023

78. Chikamoto, M. O., P. DiNezio, and N. Lovenduski, 2023: Long-term slowdown of ocean carbon uptake by alkalinity dynamics. *Geophysical Research Letters*, 50, e2022GL101954, doi:10.1029/2022GL101954.
- Press release: [Ocean surface tipping point could accelerate climate change](#)
77. Coupe, J., C. Harrison, A. Robock, A. DuVivier, E. Maroon, N. S. Lovenduski, S. Bachman, L. Landrum, and C. Bardeen, 2023: Sudden reduction of Antarctic sea ice despite cooling after nuclear war. *Journal of Geophysical Research: Oceans*, 128, e2022JC018774, doi:10.1029/2022JC018774.
76. Dunkl, I., N. Lovenduski, A. Collalti, V. K. Arora, T. Ilyina, and V. Brovkin, 2023: GPP and the predictability of CO₂: more uncertainty in what we predict than how well we predict it. *Biogeosciences*, 20, 3523-3538, doi:10.5194/bg-20-3523-2023.
75. ¹Elsworth, G. W., N. S. Lovenduski, K. M. Krumhardt, T. M. Marchitto, and S. Schlunegger, 2023: Anthropogenic climate change drives non-stationary phytoplankton internal variability. *Biogeosciences*, 20, 4477-4490, doi:10.5194/bg-20-4477-2023.
74. Fay, A. R., G. A. McKinley, N. S. Lovenduski, Y. Eddebbar, M. N. Levy, M. C. Long, H. C. Olivarez, and R. R. Rustagi, 2023: Immediate and long-lasting impacts of the Mt. Pinatubo eruption on ocean oxygen and carbon inventories. *Global Biogeochemical Cycles*, 37, e2022GB007513, doi:10.1029/2022GB007513.

73. ¹Gorte, T., N. S. Lovenduski, C. Nissen, and J. T. M. Lenaerts, 2023: Antarctic Ice Sheet freshwater discharge drives substantial Southern Ocean changes over the 21st century. *Geophysical Research Letters*, 50, e2023GL104949, doi:10.1029/2023GL104949.
72. ¹Mogen, S. C., N. S. Lovenduski, S. G. Yeager, L. Keppler, J. Sharp, S. J. Bograd, N. Cordero Quiros, E. Di Lorenzo, E. L. Hazen, M. G. Jacox, M. Pozo Buil, 2023: Skillful multi-month predictions of ecosystem stressors in the surface and subsurface ocean. *Earth's Future*, 11, e2023EF003605, doi:10.1029/2023EF003605.
71. Persch, C. F., P. DiNezio, and N. S. Lovenduski, 2023: The impact of orbital precession on air-sea CO₂ exchange in the Southern Ocean. *Geophysical Research Letters*, 50, e2023GL103820, doi:10.1029/2023GL103820.
70. Youngs, M. K., M. Freilich, and N. S. Lovenduski, 2023: Air-sea CO₂ fluxes localized by topography in a Southern Ocean channel. *Geophysical Research Letters*, 50, e2023GL104802, doi:10.1029/2023GL104802.

2022

69. Harrison, C. S., T. Rohr, A. DuVivier, E. A. Maroon, S. Bachman, C. G. Bardeen, J. Coupe, V. Garza, R. Heneghan, N. S. Lovenduski, P. Neubauer, V. Rangel, A. Robock, K. Scherrer, S. Stevenson, and O. B. Toon, 2022: A new ocean state after nuclear war. *AGU Advances*, 3(4), e2021AV000610, doi:10.1029/2021AV000610.
 · EOS editor's highlight: [The Long-Lasting Impact of a Nuclear War on the Ocean](#)
 · CU Arts & Sciences Magazine: [Large or small, nuclear war would wreak havoc on the ocean](#)
 · Press release: [How nuclear war would affect Earth today](#)
 · Forbes: [How nuclear war would affect Earth](#)
68. ¹Mogen, S. C., N. S. Lovenduski, A. R. Dallmann, L. Gregor, A. J. Sutton, S. J. Bograd, N. Cordero Quiros, E. Di Lorenzo, E. L. Hazen, M. G. Jacox, M. Pozo Buil, and S. G. Yeager, 2022: Ocean biogeochemical signatures of the North Pacific Blob. *Geophysical Research Letters*, 49(9), e2021GL096938, doi:10.1029/2021GL096938.
67. ¹Olivarez, H. C., N. S. Lovenduski, R. X. Brady, A. R. Fay, M. Gehlen, L. Gregor, P. Landschützer, G. A. McKinley, K. A. McKinnon, and D. R. Munro, 2022: Alternate histories: Synthetic large ensembles of air-sea CO₂ flux. *Global Biogeochemical Cycles*, 36(6), e2021GB007174, doi:10.1029/2021GB007174.
66. Yeager, S. G., N. Rosenbloom, A. A. Glanville, X. Wu, I. Simpson, H. Li, M. J. Molina, K. Krumhardt, S. Mogen, K. Lindsay, D. Lombardozzi, W. Wieder, W. M. Kim, J. H. Richter, M. Long, G. Danabasoglu, D. Bailey, M. Holland, N. Lovenduski, W. G. Strand, and T. King, 2022: The Seasonal-to-Multiyear Large Ensemble (SMYLE) prediction system using the Community Earth System Model version 2. *Geoscientific Model Development*, 15, 6451-6493, doi:10.5194/gmd-15-6451-2022.

2021

65. Bardeen, C. G., D. E. Kinnison, O. B. Toon, M. J. Mills, F. Vitt, L. Xia, J. Jägermeyr, N. S. Lovenduski, K. J. N. Scherrer, M. Clyne, and A. Robock, 2021: Extreme ozone loss following nuclear war results in enhanced surface ultraviolet radiation. *Journal of Geophysical Research: Atmospheres*, 126(18), e2021JD035079, doi:10.1029/2021JD035079.
64. ¹Brady, R. X., M. E. Maltrud, P. J. Wolfram, H. F. Drake, and N. S. Lovenduski, 2021: The influence of ocean topography on the upwelling of carbon in the Southern Ocean. *Geophysical Research Letters*, 48(19), e2021GL095088, doi:10.1029/2021GL095088.
 · Journal cover: [Lagrangian particle trajectories](#)
 · CU Arts & Sciences Magazine: [Underwater mountains help push carbon up to the atmosphere, oceanographers find](#)
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62. ¹Elsworth, G. W., N. S. Lovenduski, and K. A. McKinnon, 2021: Alternate history: A synthetic ensemble of ocean chlorophyll concentrations. *Global Biogeochemical Cycles*, 35(9), e2020GB006924, doi:10.1029/2020GB006924.
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