

CURRICULUM VITAE

Nicole S. Lovenduski

Department of Atmospheric and Oceanic Sciences
Institute of Arctic and Alpine Research
University of Colorado Boulder

E-mail: nicole.lovenduski@colorado.edu

Web: <http://instaar.colorado.edu/people/nikki-lovenduski/>

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

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

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

Assistant Professor, Department of Atmospheric and Oceanic Sciences, 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

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., 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.

Lovenduski, N. S., 2007-2009: Determining the future behavior of the Southern Ocean CO₂ sink. *NOAA Climate and Global Change Postdoctoral Fellowship*, \$112,000 total award.

Lovenduski, N. S., 2005-2007: Impact of the Southern Annular Mode on Southern Ocean circulation and biogeochemistry. *NASA Earth System Science Graduate Student Fellowship*, \$48,000 total award.

As co-PI

Pozo Buil, M., N. S. Lovenduski, E. Di Lorenzo, 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: Environmental and Human Impacts of Nuclear War. *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. Niemeier, 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.

Ito, T., and N. S. Lovenduski, 2009-2012: Future changes of the Southern Ocean CO₂ fluxes. *NOAA Climate Program*, \$377,623 total award.

Ito, T., and N. S. Lovenduski, 2008-2011: High-resolution modeling of the Southern Ocean carbon cycle based on ECCO state estimates. *NASA Carbon Cycle Science*, \$418,340 total award.

Selected Invited Talks

AGU Fall Meeting, Session B037, 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)

An upper division undergraduate and graduate core course

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

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

Postdoctoral researchers advised, CU Boulder

David Munro, 2012-2016

Graduate students advised, CU Boulder

Riley Brady, Ph.D. in progress, Atmospheric and Oceanic Sciences

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

Geneviève Elsworth, Ph.D. in progress, Geological Sciences

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

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

Patrick Boylan, Ph.D. 2013, Atmospheric and Oceanic Sciences

Chloe Brashear, M.S. in progress, Geological Sciences

Sebastian Cantarero, Ph.D. in progress, 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

Tessa Gorte, Ph.D. in progress, Atmospheric and Oceanic Sciences

Jessica Kenigson, Ph.D. 2018, Atmospheric and Oceanic Sciences

Shelley Knuth, Ph.D. 2014, Atmospheric and Oceanic Sciences

Mark Leonard, Ph.D. in progress, Atmospheric and Oceanic Sciences

Colin Lindsay, Ph.D. 2016, Geological Sciences
 Katherine Smith, Ph.D. 2017, Mechanical Engineering
 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
 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
 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
 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

Academic Service

External

Contributing Author, Intergovernmental Panel on Climate Change, Working Group I, Sixth Assessment Report, 2018-present.
 · 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, 2019-2022.
 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-present.

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

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

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

Graduate Advisor, Department of Atmospheric and Oceanic Sciences, 2020-present.

Faculty Search Committee, Inclusive Excellence, Dept. Atmos. and Ocean. Sci., 2019.

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-present.

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

Mentor, Summer Multicultural Access to Research Training Program, CU Boulder, 2010, 2011, 2016, 2019, 2020, 2021.

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

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

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

In Review / Revision

59. Ilyina, T., H. Li, A. Spring, W. A. Müller, L. Bopp, M. Chikamoto, G. Danabasoglu, M. Dobrynin, J. Dunne, P. Friedlingstein, W. Lee, N. S. Lovenduski, W. J. Merryfield, J. Mignot, J. Y. Park, R. Séférian, R. Sospedra-Alfonso, M. Watanabe, and S. G. Yeager, in review: Predictable variations of the carbon sinks and atmospheric CO₂ growth in a multi-model framework. *Geophysical Research Letters*.
58. Gloege, L., G. A. McKinley, P. Landschützer, A. R. Fay, T. L. Frölicher, J. C. Fyfe, T. Ilyina, S. Jones, N. S. Lovenduski, C. Rödenbeck, K. B. Rodgers, S. Schlunegger, and Y. Takano, in review: Quantifying errors in observationally-based estimates of ocean carbon sink variability. *Global Biogeochemical Cycles*.
57. Coupe, J., S. Stevenson, N. S. Lovenduski, T. Rohr, C. S. Harrison, A. Robock, H. Olivarez, C. G. Bardeen, and O. B. Toon, in revision: Nuclear Niño: A large, sustained Pacific circulation response to nuclear conflict. *Nature Communications Earth and Environment*.
56. Meehl, G. A., J. H. Richter, H. Teng, A. Capotondi, K. Cobb, F. Doblas-Reyes, M. G. Donat, M. H. England, J. C. Fyfe, W. Han, H. Kim, B. P. Kirtman, Y. Kushnir, N. S. Lovenduski, M. E. Mann, W. J. Merryfield, V. Nieves, K. Pegion, S. Sanchez, A. Scaife, D. Smith, A. C. Subramanian, L. Sun, D. Thompson, C. Ummerhofer, and S.-P. Xie, in revision: Initialized Earth system prediction from subseasonal to decadal timescales. *Nature Reviews Earth and Environment*.

In Press

55. Scherrer, K. J. N., C. S. Harrison, R. Heneghan, E. D. Galbraith, C. G. Bardeen, J. Jägermeyr, N. S. Lovenduski, A. Luna, A. Robock, J. Stevens, S. Stevenson, O. B. Toon, and L. Xia, in press: Marine wild-capture fisheries after nuclear war. *Proceedings of the National Academy of Sciences*.

2020

54. ¹Brady, R. X., N. S. Lovenduski, S. G. Yeager, M. C. Long, and K. Lindsay, 2020: Skillful multiyear predictions of ocean acidification in the California Current System. *Nature Communications*, 11, 2166, doi:10.1038/s41467-020-15722-x.
· Press release: [Ocean acidification prediction now possible years in advance](#)
53. Crawford, A. D., K. M. Krumhardt, N. S. Lovenduski, G. L. van Dijken, and K. R. Arrigo, 2020: Summer high-wind events and phytoplankton productivity in the Arctic Ocean. *Journal of Geophysical Research: Oceans*, 125, e2020JC016565, doi:10.1029/2020JC016565.
52. Deser, C., F. Lehner, K. B. Rodgers, T. Ault, T. L. Delworth, P. N. DiNezio, A. Fiore, C. Frakignoul, J. C. Fyfe, D. E. Horton, J. E. Kay, R. Knutti, N. S. Lovenduski, J. Marotzke, K. A. McKinnon, S. Minobe, J. Randerson, J. A. Screen, I. R. Simpson, and M. Ting, 2020: Strength in numbers: Insights from initial-condition large ensembles with multiple Earth system models and future prospects. *Nature Climate Change*, 10(4), 277-286, doi:10.1038/s41558-020-0731-2.
51. ¹Elsworth, G. W., N. S. Lovenduski, K. A. McKinnon, K. M. Krumhardt, and R. X. Brady, 2020: Finding the fingerprint of anthropogenic climate change in marine phytoplankton abundance. *Current Climate Change Reports*, 6(2), 37-46, doi:10.1007/s40641-020-00156-w.
50. Krumhardt, K. M., N. S. Lovenduski, M. C. Long, J. Y. Luo, S. Yeager, and C. Harrison, 2020: Potential predictability of net primary production in the ocean. *Global Biogeochemical Cycles*, 34, e2020GB006531, doi:10.1029/2020GB006531.

49. Kwiatkowski, L., O. Torres, L. Bopp, O. Aumont, M. Chamberlain, J. Christian, J. P. Dunne, M. Gehlen, T. Ilyina, J. G. John, A. Lenton, H. Li, N. S. Lovenduski, J. C. Orr, J. Palmieri, A. Tagliabue, Y. Takano, J. Tjiputra, K. Toyama, H. Tsujino, J. Schwinger, R. Séférian, C. A. Stock, M. Watanabe, A. Yamamoto, A. Yook, and T. Ziehn, 2020: Twenty-first century ocean warming, acidification, deoxygenation, and upper ocean nutrient decline from CMIP6 model projections. *Biogeosciences*, 17, 3439-3470, doi:10.5194/bg-17-3439-2020.
48. Lester, J., N. S. Lovenduski, H. Graven, M. C. Long, and K. Lindsay, 2020: Internal variability dominates over externally forced ocean circulation changes seen through CFCs. *Geophysical Research Letters*, 47, e2020GL087585, doi:10.1029/2020GL087585.
47. Lovenduski, N. S., C. S. Harrison, H. Olivarez, C. G. Bardeen, O. B. Toon, J. Coupe, A. Robock, T. Rohr, and S. Stevenson, 2020: The potential impact of nuclear conflict on ocean acidification. *Geophysical Research Letters*, 47, e2019GL086246, doi:10.1029/2019GL086246.
 · Press release: [First-of-its-kind study examines toll of nuclear war on world's oceans](#)
 · Highlight in *Nature*: [How a small nuclear war would transform the entire planet](#)
46. McKinley, G. A., A. R. Fay, Y. A. Eddebbar, L. Gloege, and N. S. Lovenduski, 2020: External forcing explains recent decadal variability of the ocean carbon sink. *AGU Advances*, 1(2), e2019AV000149, doi:10.1029/2019AV000149.
 · Editor's highlight: [Eruption and emissions take credit for ocean carbon sink changes](#)
 · Highlight in *Nature Climate Change*: [90s slow-down](#)
 · Press release: [Ocean uptake of CO₂ could drop as we cut carbon emissions](#)
45. Nevison, C., D. R. Munro, N. S. Lovenduski, R. Keeling, M. Manizza, E. Morgan, and C. Rödenbeck, 2020: Southern Annular Mode influence on wintertime ventilation of the Southern Ocean detected in atmospheric O₂ and CO₂ measurements. *Geophysical Research Letters*, 47, e2019GL085667, doi:10.1029/2019GL085667.

2019

44. ¹Brady, R. X., N. S. Lovenduski, M. A. Alexander, M. Jacox, and N. Gruber, 2019: On the role of climate modes in modulating the air-sea CO₂ fluxes in eastern boundary upwelling systems. *Biogeosciences*, 16, 329-346, doi:10.5194/bg-16-329-2019.
43. Capotondi, A., M. Jacox, C. Bowler, M. Kavanaugh, P. Lehodey, D. Barrie, S. Brodie, S. Chaffron, W. Cheng, D. F. Dias, D. Eveillard, L. Guidi, D. Iudicone, N. S. Lovenduski, J. A. Nye, I. Ortiz, D. Pirhalla, M. Pozo Buil, V. Saba, S. Sheridan, S. Siedlecki, A. Subramanian, C. de Vargas, E. Di Lorenzo, S. C. Doney, A. J. Hermann, T. Joyce, M. Merrifield, A. J. Miller, F. Not, and S. Pesant, 2019: Observational needs supporting marine ecosystems modeling and forecasting: from the global ocean to regional and coastal systems. *Frontiers in Marine Science*, 6, 623, doi:10.3389/fmars.2019.00623.
42. Gruber, N., P. Landschützer, and N. S. Lovenduski, 2019: The variable Southern Ocean carbon sink. *Annual Review of Marine Science*, 11, 159-186, doi:10.1146/annurev-marine-121916-063407.
41. ¹Krumhardt, K. M., N. S. Lovenduski, M. C. Long, M. Levy, K. Lindsay, J. K. Moore, and C. Nissen, 2019: Coccolithophore growth and calcification in an acidified ocean: Insights from Community Earth System Model simulations. *Journal of Advances in Modeling Earth Systems*, 11, 1418-1437, doi:10.1029/2018MS001483.
 · Magazine cover: [JAMES, May 2019, Volume 11, Issue 5](#)
40. Landschützer, P., T. Ilyina, and N. S. Lovenduski, 2019: Detecting regional modes of variability in observation-based surface ocean pCO₂. *Geophysical Research Letters*, 46, 2670-2679, doi:10.1029/2018GL081756.
 · Editor's highlight: [Sea-Surface Carbon Patterns Linked to Large-scale Climate Modes](#)
39. Lovenduski, N. S., G. B. Bonan, S. G. Yeager, K. Lindsay, and D. L. Lombardozzi, 2019: High predictability of terrestrial carbon fluxes from an initialized decadal prediction system. *Environmental Research Letters*, 14(12), 124074, doi:10.1088/1748-9326/ab5c55.
38. Lovenduski, N. S., S. G. Yeager, K. Lindsay, and M. C. Long, 2019: Predicting near-term variability in ocean carbon uptake. *Earth System Dynamics*, 10, 45-57, doi:10.5194/esd-10-45-2019.

37. ¹Negrete-García, G., N. S. Lovenduski, C. Hauri, K. M. Krumhardt, and S. K. Lauvset, 2019: Sudden emergence of a shallow aragonite saturation horizon in the Southern Ocean. *Nature Climate Change*, 9(4), 313-317, doi:10.1038/s41558-019-0418-8.
 · Magazine cover: [Shallowing Southern Ocean aragonite](#)
 · Press release: [Marine organisms face fatal horizon in Southern Ocean](#)
36. Toon, O. B., C. G. Bardeen, A. Robock, L. Xia, H. Kristensen, M. McKinzie, R. J. Peterson, C. S. Harrison, N. S. Lovenduski, and R. P. Turco, 2019: Rapid expansion of nuclear arsenals by Pakistan and India portend regional and global catastrophe. *Science Advances*, 5(10), eaay5478, doi:10.1126/sciadv.aay5478.
 · Bulletin of the Atomic Scientists: [How an India-Pakistan nuclear war could start - and have global consequences](#)
 · Press release: [An India-Pakistan nuclear war could kill millions, threaten global starvation](#)
35. Zhang, L., W. Han, Y. Li, and N. S. Lovenduski, 2019: Variability of sea level and upper-ocean heat content in the Indian Ocean: Effects of Subtropical Indian Ocean Dipole and ENSO. *Journal of Climate*, 32, 7227-7245, doi:10.1175/JCLI-D-19-0167.1.

2018

34. Fay, A. R., N. S. Lovenduski, G. A. McKinley, D. R. Munro, C. Sweeney, A. R. Gray, P. Landschützer, B. Stephens, T. Takahashi, and N. Williams, 2018: Utilizing the Drake Passage Time-series to understand variability and change in subpolar Southern Ocean pCO₂. *Biogeosciences*, 15, 3841-3855, doi:10.5194/bg-15-3841-2018.
33. ¹Freeman, N. M., N. S. Lovenduski, D. R. Munro, K. M. Krumhardt, K. Lindsay, M. C. Long, and M. MacLennan, 2018: The variable and changing Southern Ocean Silicate Front: Insights from the CESM Large Ensemble. *Global Biogeochemical Cycles*, 32, 752-768, doi:10.1029/2017GB005816.
32. Harrison, C. S., M. C. Long, N. S. Lovenduski, and J. K. Moore, 2018: Mesoscale effects on carbon export: a global perspective. *Global Biogeochemical Cycles*, 32, 680-703, doi:10.1002/2017GB005751.
31. McKinley, G. A., A. L. Ritzer, and N. S. Lovenduski, 2018: Mechanisms of northern North Atlantic biomass variability. *Biogeosciences*, 15, 6049-6066, doi:10.5194/bg-15-6049-2018.
30. Nevison, C., D. R. Munro, N. S. Lovenduski, N. Cassar, R. F. Keeling, P. Krummel, and J. Tjiputra, 2018: Net community production in the Southern Ocean: Insights from comparing atmospheric potential oxygen to satellite ocean color algorithms and ocean models. *Geophysical Research Letters*, 45, 10549-10559, doi:10.1029/2018GL079575.
29. Smith, K. M., P. E. Hamlington, K. Niemeyer, B. Fox-Kemper, and N. S. Lovenduski, 2018: Effects of Langmuir turbulence on upper ocean carbonate chemistry. *Journal of Advances in Modeling Earth Systems*, 10, 3030-3048, doi:10.1029/2018MS001486.
28. Turi, G., M. Alexander, N. S. Lovenduski, A. Capotondi, J. Scott, C. Stock, J. Dunne, J. John, and M. Jacox, 2018: Response of O₂ and pH to ENSO in the California Current System in a high resolution global climate model. *Ocean Science*, 14, 69-86, doi:10.5194/os-2017-66.
27. Yeager, S.G., G. Danabasoglu, N.A. Rosenbloom, W. Strand, S.C. Bates, G.A. Meehl, A.R. Karspeck, K. Lindsay, M.C. Long, H. Teng, and N.S. Lovenduski, 2018: Predicting near-term changes in the Earth System: A large ensemble of initialized decadal prediction simulations using the Community Earth System Model. *Bulletin of the American Meteorological Society*, 99, 1867-1886, doi:10.1175/BAMS-D-17-0098.1.

2017

26. ¹Brady, R. X., M. A. Alexander, N. S. Lovenduski, and R. R. Rykaczewski, 2017: Emergent anthropogenic trends in California Current upwelling. *Geophysical Research Letters*, 44, 5044-5052, doi:10.1002/2017GL072945.
 · AGU Research Spotlight: [How Will Climate Change Affect the California Current Upwelling?](#)
25. ¹Krumhardt, K. M., N. S. Lovenduski, M. D. Iglesias-Rodriguez, and J. A. Kleypas, 2017: Coccolithophore growth and calcification in a changing ocean. *Progress in Oceanography*, 159, 276-295, doi:10.1016/j.pocean.2017.10.007.

24. ¹Krumhardt, K. M., N. S. Lovenduski, M. C. Long, and K. Lindsay, 2017: Avoidable impacts of ocean warming on marine primary production: Insights from the CESM ensembles. *Global Biogeochemical Cycles*, 31, 114-133, doi:10.1002/2016GB005528.
23. Lovenduski, N. S., and G. B. Bonan, 2017: Reducing uncertainty in projections of terrestrial carbon uptake. *Environmental Research Letters*, 12, 044020, doi:10.1088/1748-9326/aa66b8.
 · Perspective: [Carbon futures: a valiant attempt to bring scientific order from modeling chaos](#)
 · IOP News: [How much carbon will Earth absorb in future? It's hard to say...](#)
22. McKinley, G. A., A. R. Fay, N. S. Lovenduski, and D. J. Pilcher, 2017: Natural variability and anthropogenic trends in the ocean carbon sink. *Annual Review of Marine Science*, 9, 125-150, doi:10.1146/annurev-marine-010816-060529.

2016

21. ¹Freeman, N. M., and N. S. Lovenduski, 2016: Mapping the Antarctic Polar Front: Weekly realizations from 2002 to 2014. *Earth System Science Data*, 8, 191-198, doi:10.5194/essd-8-191-2016.
20. ¹Freeman, N. M., N. S. Lovenduski, and P. R. Gent, 2016: Temporal variability in the Antarctic Polar Front (2002-2014). *Journal of Geophysical Research: Oceans*, 121, 7263-7276, doi:10.1002/2016JC012145.
19. ¹Krumhardt, K. M., N. S. Lovenduski, N. M. Freeman, and N. R. Bates, 2016: Apparent increase in coccolithophore abundance in the subtropical North Atlantic from 1990 to 2014. *Biogeosciences*, 13, 1163-1177, doi:10.5194/bg-13-1163-2016.
 · Ocean Carbon and Biogeochemistry News: [A chalkier ocean?](#)
18. Lovenduski, N. S., G. A. McKinley, A. R. Fay, K. Lindsay, and M. C. Long, 2016: Partitioning uncertainty in ocean carbon uptake projections: Internal variability, emission scenario, and model structure. *Global Biogeochemical Cycles*, 30, 1276-1287, doi:10.1002/2016GB005426.
 · Commentary: [Quantifying uncertainty in future ocean carbon uptake](#)
 · AGU Research Spotlight: [Can We Predict the Future of Ocean Carbon Dioxide Uptake?](#)
17. McKinley, G. A., D. J. Pilcher, A. R. Fay, K. Lindsay, M. C. Long, and N. S. Lovenduski, 2016: Timescales for detection of trends in the ocean carbon sink. *Nature*, 530, 469-472, doi:10.1038/nature16958.
 · Nature News & Views: [Climate science: Hidden trends in the ocean carbon sink](#)

2015

16. ¹Conrad, C. J., and N. S. Lovenduski, 2015: Climate-driven variability in the Southern Ocean carbonate system. *Journal of Climate*, 28(13), 5335-5350, doi:10.1175/JCLI-D-14-00481.1.
15. ¹Freeman, N. M., and N. S. Lovenduski, 2015: Decreased calcification in the Southern Ocean over the satellite record. *Geophysical Research Letters*, 42, 1834-1840, doi:10.1002/2014GL062769.
 · Nature Climate Change research highlight: [Calcification changes](#)
 · The New York Times: [Phytoplankton on Decline in Southern Ocean](#)
 · Press Release: [Shell-shocked: Ocean acidification likely hampers tiny shell builders in Southern Ocean](#)
14. Lovenduski, N. S., A. R. Fay, and G. A. McKinley, 2015: Observing multidecadal trends in Southern Ocean CO₂ uptake: What can we learn from an ocean model? *Global Biogeochemical Cycles*, 29, 416-426, doi:10.1002/2014GB004933.
13. Lovenduski, N. S., M. C. Long, and K. Lindsay, 2015: Natural variability in the surface ocean carbonate ion concentration. *Biogeosciences*, 12, 6321-6335, doi:10.5194/bg-12-6321-2015.
12. ²Munro, D. R., N. S. Lovenduski, B. B. Stephens, T. Newberger, K.R. Arrigo, T. Takahashi, P. D. Quay, J. Sprintall, N. Freeman, and C. Sweeney, 2015: Estimates of net community production in the Southern Ocean determined from time series observations (2002-2011) of nutrients, dissolved inorganic carbon, and surface ocean pCO₂ in Drake Passage. *Deep Sea Research II*, 114, 49-63, doi:10.1016/j.dsr2.2014.12.014.

11. ²Munro, D. R., N. S. Lovenduski, T. Takahashi, B. B. Stephens, T. Newberger, and C. Sweeney, 2015: Recent evidence for a strengthening CO₂ sink in the Southern Ocean from carbonate system measurements in the Drake Passage (2002-2015). *Geophysical Research Letters*, 42, 7623-7630, doi:10.1002/2015GL065194.
 - Science perspective: [An increasing carbon sink?](#)
 - Christian Science Monitor: [Nature's global warming 'sink' isn't clogged anymore, studies say](#)
 - Press release: [Scientists find Southern Ocean removing CO₂ from the atmosphere more efficiently](#)

2014 and earlier

10. Fay, A. R., G. A. McKinley, and N. S. Lovenduski, 2014: Southern Ocean carbon trends: Sensitivity to methods. *Geophysical Research Letters*, 41, 6833-6840, doi:10.1002/2014GL061324.
9. Lenton, A., B. Tilbrook, R. Law, D. C. E. Bakker, S. C. Doney, N. Gruber, M. Ishii, M. Hoppema, N. S. Lovenduski, R. J. Matear, B. I. McNeil, N. Metz, S. E. Mikaloff Fletcher, P. M. S. Monteiro, C. Rodenbeck, C. Sweeney, and T. Takahashi, 2013: Sea-air CO₂ fluxes in the Southern Ocean for the period 1990-2009. *Biogeosciences*, 10, 4037-4054, doi:10.5194/bg-10-4037-2013.
8. Lovenduski, N. S., M. C. Long, P. R. Gent, and K. Lindsay, 2013: Multi-decadal trends in the advection and mixing of natural carbon in the Southern Ocean. *Geophysical Research Letters*, 40, 139-142, doi:10.1029/2012GL054483.
7. Strutton, P. G., N. S. Lovenduski, M. Mongin, and R. Matear, 2012: Quantification of Southern Ocean plankton biomass and primary productivity via satellite observations and biogeochemical models. *CCAMLR Science*, 19, 247-265.
6. Jones, D. C., T. Ito, and N. S. Lovenduski, 2011: The transient response of the Southern Ocean pycnocline to changing atmospheric winds. *Geophysical Research Letters*, 38, L15604, doi:10.1029/2011GL048145.
5. Lovenduski, N. S., and T. Ito, 2009: The future evolution of the Southern Ocean CO₂ sink. *Journal of Marine Research*, 67(5), 597-617, doi:10.1357/002224009791218832.
4. Lovenduski, N. S., N. Gruber, and S. C. Doney, 2008: Toward a mechanistic understanding of the decadal trends in the Southern Ocean carbon sink. *Global Biogeochemical Cycles*, 22, GB3016, doi:10.1029/2007GB003139.
3. Lovenduski, N. S., N. Gruber, S. C. Doney, and I. D. Lima, 2007: Enhanced CO₂ outgassing in the Southern Ocean from a positive phase of the Southern Annular Mode. *Global Biogeochemical Cycles*, 21, GB2026, doi:10.1029/2006GB002900.
2. Lovenduski, N. S., and N. Gruber, 2005: Impact of the Southern Annular Mode on Southern Ocean circulation and biology. *Geophysical Research Letters*, 32, L11603, doi:10.1029/2005GL022727.
1. Ehlmann, B. L., R. E. Arvidson, B. L. Jolliff, S. S. Johnson, B. Ebel, N. Lovenduski, J. D. Morris, J. A. Byers, N. O. Snider, and R. E. Criss, 2005: Hydrologic and Isotopic Modeling of Alpine Lake Waiiau, Mauna Kea, Hawai'i. *Pacific Science*, 59(1), 1-15, doi:10.1353/psc.2005.0005.