

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

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

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

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

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, 2016-2019: 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

Robock, A., O. B. Toon, et al., including N. Lovenduski, 2017-2020: 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, 2016-2019: 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.

Invited Talks

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.

Extending the Climate-Carbon Cycle Feedback Framework Workshop, Bern, Switzerland, April 2018.

Southern Ocean Carbon and Climate Observations and Modeling (SOCCOM) Annual Meeting, Princeton, NJ, May 2017.

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.

Community Surface Dynamics Modeling System Annual Meeting, Boulder, CO, May 2016.

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.

Ocean Ecologies and their Physical Habitats in a Changing Climate Workshop, Columbus, OH, June 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.
 Department of Atmospheric Sciences, Texas A&M University, College Station, TX, March 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

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)

An upper division undergraduate and graduate core course

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

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

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

Kristen Krumhardt, Ph.D. 2018, 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
Sebastian Cantarero, Ph.D. in progress, Geological Sciences
Whitney Doss, Ph.D. 2014, Geological Sciences
Alice DuVivier, Ph.D. 2015, Atmospheric and Oceanic 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
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

Undergraduate students advised, CU Boulder

Marvin Alfaro, Summer Multicultural Access to Research Training (SMART) mentee, 2010
Katherine Chan, Summer Multicultural Access to Research Training (SMART) mentee, 2016
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
Adelicia 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-Garcia, Significant Opportunities in Atmospheric Research and Science (SOARS) mentee, 2017-2018
Holly Olivarez, Significant Opportunities in Atmospheric Research and Science (SOARS) mentee, 2018
Zoraida Perez-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, Chapter 5 “Global carbon and other biogeochemical cycles and feedbacks,” 2018-present.
- Editor, Current Climate Change Reports, Carbon cycle section, 2018-present.
- Member, US CLIVAR Working Group on Large Initial Condition Earth System Model Ensembles, 2018-2021.
- 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

- Personnel Committee for Directorate membership, 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

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

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

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

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

41. Capotondi, A., M. Jacox, C. Bowler, M. Kavanaugh, P. Lehodey, D. Barrie, S. Brodie, S. Chaffron, W. Cheng, D. Faggiani Dias, D. Eveillard, L. Guidi, D. Iudicone, N. Lovenduski, J. A. Nye, I. Ortiz, D. E. Pirhalla, M. Pozo Buil, V. Saba, S. C. 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, in review: Observational needs supporting marine ecosystems modeling and forecasting. *Frontiers in Marine Science*.
40. Landschützer, P., T. Ilyina, and N. S. Lovenduski, in revision: Can we detect regional modes of variability in observation-based surface ocean pCO₂? *Geophysical Research Letters*.
39. ¹Krumhardt, K. M., N. S. Lovenduski, M. C. Long, M. Levy, K. Lindsay, J. K. Moore, and C. Nissen, in revision: Coccolithophore growth and calcification in an acidified ocean: Insights from Community Earth System Model simulations. *Journal of Advances in Modeling Earth Systems*.

In Press

38. ¹Brady, R. X., N. S. Lovenduski, M. A. Alexander, M. Jacox, and N. Gruber, in press: On the role of climate modes in modulating the air-sea CO₂ fluxes in eastern boundary upwelling systems. *Biogeosciences*, doi:10.5194/bg-2018-415.
37. Lovenduski, N. S., S. G. Yeager, K. Lindsay, and M. C. Long, in press: Predicting near-term variability in ocean carbon uptake. *Earth System Dynamics*, doi:10.5194/esd-2018-73.
36. ¹Negrete-García, G., N. S. Lovenduski, C. Hauri, K. M. Krumhardt, and S. K. Lauvset, in press: Sudden emergence of a shallow aragonite saturation horizon in the Southern Ocean. *Nature Climate Change*.

In Print

35. 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.
34. 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.
33. 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.
32. 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.
31. 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.
30. 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.

29. 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.
28. 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.
27. 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.
26. 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.
25. 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?](#)
24. 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...](#)
23. 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.
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.
21. 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.
20. 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?](#)
19. 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.
18. 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?](#)
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](#)
16. 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.
15. 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](#)
14. 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.
 13. 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.
 12. 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](#)
 11. 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.
 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. Metzler, 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 Waiau, Mauna Kea, Hawai'i. *Pacific Science*, 59(1), 1-15, doi:10.1353/psc.2005.0005.