

MADELEINE K. YOUNGS

University of Maryland, College Park | Atmospheric and Oceanic Science
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EDUCATION

MIT - WHOI Joint Program in Oceanography
PhD in Physical Oceanography 2015-2020
Dissertation Title: Residual Overturning Circulation and Its Connection to Southern Ocean Dynamics
Awarded the CG Rossby Thesis Award by MIT-EAPS

California Institute of Technology
B.S. in Applied and Computational Mathematics with Honors 2011-2015

RESEARCH INTERESTS

Physical Oceanography, Climate Dynamics, Southern Ocean Dynamics, Geophysical Fluid Dynamics

PROFESSIONAL EXPERIENCE

Assistant Professor, University of Maryland, College Park
Department of Atmospheric and Oceanic Science January 2025 - present

Postdoctoral Researcher, UCLA January 2023 - December 2024
Advised by Professors Andrew Stewart and Andrew Thompson

Postdoctoral Researcher, NYU September 2022 - January 2023
Advised by Professor Edwin Gerber

NOAA Climate and Global Change Postdoctoral Fellow, NYU September 2020 - August 2022
Project Title: Northern Hemisphere Climatological Storm Tracks Under Climate Change: A Dynamical Systems Perspective
Advised by Professor Edwin Gerber

Graduate Student Researcher, MIT September 2015 - August 2020
Advised by Professor Glenn Flierl

Geophysical Fluid Dynamics Fellow, Woods Hole Oceanographic Institution June 2017 - August 2017
Advised by Dr. Joseph Pedlosky

Staff Researcher, Caltech June 2015 - August 2015
Advised by Professor Andrew Thompson

Student Researcher, Caltech January 2012 - June 2015
Advised by Professor Andrew Thompson

Hollings Scholar Intern, NOAA/PMEL June 2014 - August 2014
Advised by Dr. Gregory Johnson

PUBLICATIONS

10. Youngs, M. K., A. L. Stewart, Y. Si, A. F. Thompson, and M. Scholdlok, 2025. Quantifying climatic forcing versus meltwater feedbacks on the Antarctic Ice Shelf melt. *Nature Geosciences*, under review.
9. Wilson, E.A. et al., 2024. Future Priorities for Observing the Dynamics of the Southern Ocean. *Bulletin of the American Meteorological Society*.
8. Youngs, M. K., N. Lovenduski, and M. Freilich, 2023. Carbon Outgassing Hotspots in a Southern Ocean-Like Channel. *Geophysical Research Letters*.
7. Youngs, M. K., and G.R. Flierl, 2023. Connecting Residual Overturning Theory with the Topographically Localized Overturning in the Southern Ocean. *Journal of Physical Oceanography*.
6. Youngs, M. K., R. Ferrari and G.R. Flierl, 2020. Basin-Width Dependence of Northern Deep Convection. *Geophysical Research Letters*, 47, e2020GL089135, doi:10.1029/2020GL089135

5. Youngs, M. K., G.R. Flierl, and R. Ferrari, 2019. Role of Residual Overturning for the Sensitivity of Southern Ocean Isopycnal Slopes to Changes in Wind Forcing. *Journal of Physical Oceanography*, **49**, 2867-2881, doi:10.1175/JPO-D-19-0072.1
4. Youngs, M. K., A. F. Thompson, A. Lazar, and K. J. Richards, 2017: ACC Meanders, Energy Transfer, and Mixed Barotropic- Baroclinic Instability. *Journal of Physical Oceanography*, **47**, 1291-1305, doi:10.1175/JPO-D-16-0160.1.
3. Youngs, M. K., and G. C. Johnson, 2015: Basin-wavelength Equatorial Deep Jet Signals Across Three Oceans. *Journal of Physical Oceanography*, **45**, 2134-2148, doi:10.1175/JPO-D-14-0181.1.
2. Youngs, M. K., A. F. Thompson, M. M. Flexas, and K. J. Heywood, 2015: Weddell Sea export pathways from surface drifters. *Journal of Physical Oceanography*, **45**, 1068-1085, doi:10.1175/JPO-D-14-0103.1.
1. Thompson, A. F., and M. K. Youngs, 2013: Surface exchange between the Weddell and Scotia Seas. *Geophysical Research Letters*, **40**, 5920-5925, doi:10.1002/2013GL058114.

STUDENTS ADVISED/MENTORED

Alan Whelan, UMD Undergraduate	May 2025-present
Eliza Lerman, UCLA Undergraduate	January 2024-December 2024
Ruth Moorman, Caltech PhD Student	July 2023-December 2024
Jackson Wilke, UCLA Undergraduate	April-September 2023

FUNDED GRANTS

NSF OPP: Connecting the Three-Dimensional Pathways of Carbon and Overturning in the Southern Ocean
 \$626,292 - Recommended for funding to start January 2026.

TEACHING EXPERIENCE

Undergraduate Physical Oceanography UCLA Guest Lecturer 2 lectures - <i>The Antarctic Circumpolar Current and the Polar Oceans</i>	Fall 2023
Graduate Physical Oceanography UCLA Guest Lecturer - <i>Residual Mean Circulation of the Southern Ocean</i>	Spring 2023
Water Sourcing and Delivery in an Era of Climate Change - NYU Wagner Guest Lecturer - <i>Climate Models</i>	Fall 2021
Introduction to Atmos., Ocean, and Climate Dynamics, MIT 12.003 Teaching Assistant	Fall 2018
Partial Differential Equations and Transforms, MIT-WHOI Joint Program Math Review Instructor (6 hours total instruction time)	Summer 2016
Partial Differential Equations, Caltech ACM 95/100c Teaching Assistant	Spring 2014
Complex Analysis, Caltech ACM 95/100a Teaching Assistant	Fall 2013

CRUISE EXPERIENCE

Thwaites Cruise Deployment and recovery of Seagliders and SOCCOM Floats in Southern Ocean on <i>NBP</i>	January-March 2020
OSMOSIS (Ocean Surface Mixing, Ocean Submesoscale Interaction Study) Recovery of Seagliders at Porcupine Abyssal Plain site on RRS <i>James Cook</i>	September 2013

HONORS AND AWARDS

C-G Rossby Award - MIT-PAOC Thesis Award	September 2021
NOAA Climate and Global Change Postdoctoral Fellowship	September 2020 - August 2022
Geophysical Fluid Dynamics Summer School Fellow	Summer 2017
NDSEG Fellow	September 2017- August 2020
NSF-GRFP Recipient	April 2017
Hertz Fellowship Finalist	March 2016
Norman C. Rasumussen MIT-Earth Atmospheric and Planetary Sciences Fellowship	2015-2016

American Meteorological Society Graduate Fellowship
 NOAA - Student Science and Education Symposium - Outstanding Presentation Award
 Fritz B. Burns Award in Geology - Caltech
 NOAA - Hollings Scholar

2015-2016
 July 2014
 June 2014
 2013-2015

INVITED SEMINARS

University of Delaware Oceanography Seminar <i>Quantifying climatic forcing versus meltwater feedbacks on the Antarctic continental shelf</i>	February 2025
University of Maryland AOSC Seminar <i>Southern Ocean Circulation and Climate: The Localizing Effect of Topography</i>	April 2024
UConn Physical Oceanography Seminar <i>Southern Ocean Circulation and Climate: The Localizing Effect of Topography</i>	April 2024
UC Santa Barbara Geography Seminar <i>Southern Ocean Circulation and Climate: The Localizing Effect of Topography</i>	March 2024
University of Waterloo Applied Mathematics Seminar <i>Southern Ocean Circulation and Climate: The Localizing Effect of Topography</i>	January 2024
Stanford CLAOB Seminar <i>Southern Ocean Circulation and Climate: The Localizing Effect of Topography</i>	November 2023
UCLA - AOS 270 Seminar <i>Southern Ocean Circulation and Climate: The Localizing Effect of Topography</i>	October 2023
University of Washington Physical Oceanography Seminar <i>Southern Ocean Circulation and Climate: The Localizing Effect of Topography</i>	March 2023
Cornell Atmospheric Sciences Seminar <i>Baroclinic Annular Mode in the Southern Hemisphere</i>	November 2022
GFD Summer School Seminar <i>Baroclinic Annular Mode in the Southern Hemisphere</i>	July 2022
Caltech - Visiting Seminar <i>Southern Ocean Circulation and Climate: The Localizing Effect of Topography</i>	May 2022
UCLA - AOS 271 Seminar <i>Southern Ocean Circulation and Climate: The Localizing Effect of Topography</i>	May 2022
Florida State University Physical Oceanography Seminar <i>Southern Ocean Circulation and Climate: The Localizing Effect of Topography</i>	March 2022
Rice University EEPs Seminar <i>Southern Ocean Circulation and Climate: The Localizing Effect of Topography</i>	February 2022
Physical Oceanography Dissertation Symposium (Lihue, HI) <i>Overturning Circulation and its Connection to Southern Ocean Dynamics</i>	October 2021
CLIVAR POS Summer Meeting <i>Southern Ocean Circulation and Climate: The localizing effect of Topography</i>	August 2021
University of Washington Physical Oceanography Seminar <i>Localized Southern Ocean Overturning and Implications for Sensitivity</i>	March 2021
NYU Courant Center for Atmosphere Ocean Science Colloquium <i>Localized Southern Ocean Overturning and Implications for Sensitivity</i>	October 2020
UChicago Geophysical Sciences Colloquium <i>Role of Residual Overturning for the Sensitivity of Southern Ocean Isopycnal Slopes</i>	November 2019

WHOI Physical Oceanography Seminar <i>Role of Residual Overturning for the Sensitivity of Southern Ocean Isopycnal Slopes</i>	November 2019
NYU Courant Center for Atmosphere Ocean Science Student Seminar <i>Three Dimensional Residual Circulation of the Southern Ocean</i>	October 2019
Yale Atmosphere, Ocean, and Climate Dynamics Seminar <i>Three Dimensional Residual Circulation of the Southern Ocean</i>	October 2019
Stanford Climate Atmosphere and Ocean Dynamics Seminar <i>Three Dimensional Residual Circulation of the Southern Ocean</i>	August 2019
URI - Graduate School in Oceanography <i>ACC Meanders, Energy Transfer, and Mixed Barotropic- Baroclinic Instability</i>	October 2017
UCLA - Oceanography Seminar <i>ACC Meanders, Energy Transfer, and Mixed Barotropic- Baroclinic Instability</i>	June 2016
NASA - JPL Oceanography Seminar Series <i>Weddell Sea export pathways from surface drifters</i>	August 2013

PROFESSIONAL MEMBERSHIPS

American Geophysical Union
American Meteorological Society

ORGANIZING AND CONVENING

Session chair - AGU Fall Meeting Global Meridional Overturning Circulation	December 2023, 2024
Organizing Committee - NSF OPP Southern Ocean Physical Oceanography Fieldwork Workshop	April 2024
Session chair - Ocean Sciences Meeting 2024 New Orleans, LA	February 2024
Session chair - AGU Fall Meeting 2023 Global Meridional Overturning Circulation	December 2023
Organizing Committee CalGFD Workshop 2023	September 2023
Session chair - Ocean Sciences Meeting 2022 Honolulu, HI	February 2022
Session chair - Ocean Sciences Meeting 2020 San Diego, CA	February 2020
American Meteorological Society, Atmospheric and Oceanic Fluid Dynamics Committee	2017-2020
Graduate Climate Conference 2017 Co-Chair	2017
PAOC Colloquium Seminar Series Committee Member and Chair	2016-2018

SERVICE AND OUTREACH

Reviewer for Journal of Physical Oceanography, Geophysical Research Letters, Journal of Atmospheric Sciences, Nonlinear Dynamics, Journal of Geophysical Research: Oceans, JAMES	2016-present
Women in Course XII Board Member	2016-2018
Women in Course XII Treasurer	2016-2017
Volunteer for Cambridge Science Festival	2016, 2018
National Ocean Sciences Bowl	2012, 2017, 2018

SELECTED CONFERENCE PRESENTATIONS

Youngs, M. K., et al., <i>Ice-Shelf Melt Feedbacks in a Circumpolar Model</i> . AGU Fall Meeting, Washington, DC, December 2024, talk	
Youngs, M. K., et al., <i>Ice-Shelf Melt Feedbacks in a Circumpolar Model</i> . SOCCOM Annual Meeting, Princeton, NJ, June 2024, poster	
Youngs, M. K., et al., <i>Efficient Representation of Parcel Advection using Thickness-Weighted Velocities</i> . Gordon Ocean Mixing 2024, June 2024, poster	
Youngs, M. K., et al., <i>Carbon Outgassing Hotspots in a Southern Ocean-Like Channel</i> . SOCal BOOM Meeting, Irvine, CA. November 2023, talk	
Youngs, M. K., et al., <i>Ice-Shelf Melt Feedbacks in a Southern Ocean Model</i> . CalGFD Meeting, La Jolla, CA. September 2023, talk .	
Youngs, M. K., et al., <i>Ice-Shelf Melt Feedbacks in a Southern Ocean Model</i> . SOCCOM Annual Meeting, Princeton, NJ. June 2023, talk .	

Youngs, M. K., et al., *Carbon Outgassing Hotspots in a Southern Ocean-Like Channel*. SOCCOM Annual Meeting, Princeton, NJ. June 2022, **talk**.

Youngs, M. K.. *Mixed-Shear Instability: What sets the momentum fluxes and why they matter*. Ocean Mixing Gordon Research Seminar 2022, South Hadley, MA. June 2022, **Invited talk**.

Youngs, M. K.. Flierl G. R. *Three-dimensional Overturning Circulation Localized by Topography in the Southern Ocean*. Ocean Mixing Gordon Research Conference 2022, South Hadley, MA. June 2022, **Poster**.

Youngs, M. K., Flierl G. R. *Three-dimensional Overturning Circulation Localized by Topography in the Southern Ocean and Its Implications*. Ocean Sciences 2022, Honolulu, HI. February 2022, **talk**.

Youngs, M. K., Gerber E. P. *Exploring the Mechanism(s) of the Baroclinic Annular Mode in a Hierarchy of Models*. AMS Annual Meeting, Houston, TX. January 2022, **talk**.

Youngs, M. K., et al., *Role of Residual Overturning for the Sensitivity of Southern Ocean Isopycnal Slopes to Changes in Wind Forcing*. American Meteorological Society Atmospheric and Oceanic Fluid Dynamics Meeting, Portland, ME. June 2019, **talk**.

Youngs, M. K., et al., *Carbon Outgassing Hotspots in a Southern Ocean-Like Channel*. Harvard Crimson Climate Conference, Cambridge, MA. May 2019, **talk**.

Youngs, M. K., et al., *ACC Meanders, Energy Transfer, and Mixed Barotropic-Baroclinic Instability*. Ocean Sciences Meeting, Portland, OR. February 2018, **invited poster**.

Youngs, M. K., Ferrari R. *Salt's Role in the Basin-Width Dependence of Northern Deep Convection*. Ocean Sciences Meeting, Portland, OR. February 2018, **talk**.

Youngs, M. K., Ferrari R. *Basin Width and Convection Shut Off*. NCAR Southern Ocean Workshop, Boulder, CO. April 2017, **poster**.

Youngs, M. K., et al., *Eddy-Mean Flow Interactions in an ACC Meander*. Ocean Sciences Meeting, New Orleans, LA. February 2016, **poster**.

Youngs, M. K., Johnson, G. C. *Planetary Wave Signatures Across Three Oceans*. AGU Fall Meeting, San Francisco, CA. December 2015, **invited talk**.

Youngs, M. K., Johnson, G. C. *Planetary Wave Signatures Across Three Oceans*. American Meteorological Society Atmospheric and Oceanic Fluid Dynamics Meeting, Minneapolis, MN. June 2015, **poster**.

Youngs, M. K., Thompson, A. F. *Export from the Weddell Sea: Monitoring the surface circulation near the tip of the Antarctic Peninsula using drifters*. Ocean Sciences, Honolulu, HI. March 2014, **poster**.

Youngs, M. K., Thompson, A. F. *Export from the Weddell Sea: Monitoring the surface circulation near the tip of the Antarctic Peninsula using drifters*. Gordon Research Seminar: Polar Marine Science, Ventura, CA. March 2013, **poster**.