

MADELEINE K. YOUNGS

University of Maryland, College Park | Atmospheric and Ocean 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 January 2025 -

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

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

Eliza Lerman, UCLA Undergraduate	January 2024-December 2024
Ruth Moorman, Caltech PhD Student	July 2023-December 2024
Jackson Wilke, UCLA Undergraduate	April-September 2023

TEACHING EXPERIENCE

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

FUNDED GRANTS

NCAR/CISL University Large Allocation Grant (2.2 M Core-hours)	October 2018-September 2022
Unfunded-Collaborator for NSF OCE-1536515	September 2020-September 2021
American Geophysical Union Travel Grant to Attend Fall Meeting 2014	August 2014

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. Rasmusen MIT-Earth Atmospheric and Planetary Sciences Fellowship	2015-2016
American Meteorological Society Graduate Fellowship	2015-2016
NOAA - Student Science and Education Symposium - Outstanding Presentation Award	July 2014
Fritz B. Burns Award in Geology - Caltech	June 2014

NOAA - Hollings Scholar

2013-2015

INVITED SEMINARS

University of Delaware Oceanography Seminar

February 2025

*Quantifying climatic forcing versus meltwater feedbacks on the Antarctic continental shelf***University of Maryland AOSC Seminar**

April 2024

*Southern Ocean Circulation and Climate: The Localizing Effect of Topography***UConn Physical Oceanography Seminar**

April 2024

*Southern Ocean Circulation and Climate: The Localizing Effect of Topography***UC Santa Barbara Geography Seminar**

March 2024

*Southern Ocean Circulation and Climate: The Localizing Effect of Topography***University of Waterloo Applied Mathematics Seminar**

January 2024

*Southern Ocean Circulation and Climate: The Localizing Effect of Topography***Stanford CLAOB Seminar**

November 2023

*Southern Ocean Circulation and Climate: The Localizing Effect of Topography***UCLA - AOS 270 Seminar**

October 2023

*Southern Ocean Circulation and Climate: The Localizing Effect of Topography***University of Washington Physical Oceanography Seminar**

March 2023

*Southern Ocean Circulation and Climate: The Localizing Effect of Topography***Cornell Atmospheric Sciences Seminar**

November 2022

*Baroclinic Annular Mode in the Southern Hemisphere***GFD Summer School Seminar**

July 2022

*Baroclinic Annular Mode in the Southern Hemisphere***Caltech - Visiting Seminar**

May 2022

*Southern Ocean Circulation and Climate: The Localizing Effect of Topography***UCLA - AOS 271 Seminar**

May 2022

*Southern Ocean Circulation and Climate: The Localizing Effect of Topography***Florida State University Physical Oceanography Seminar**

March 2022

*Southern Ocean Circulation and Climate: The Localizing Effect of Topography***Rice University EEPS Seminar**

February 2022

*Southern Ocean Circulation and Climate: The Localizing Effect of Topography***Physical Oceanography Dissertation Symposium (Lihue, HI)**

October 2021

*Overturning Circulation and its Connection to Southern Ocean Dynamics***CLIVAR POS Summer Meeting**

August 2021

*Southern Ocean Circulation and Climate: The localizing effect of Topography***University of Washington Physical Oceanography Seminar**

March 2021

*Localized Southern Ocean Overturning and Implications for Sensitivity***NYU Courant Center for Atmosphere Ocean Science Colloquium**

October 2020

*Localized Southern Ocean Overturning and Implications for Sensitivity***UChicago Geophysical Sciences Colloquium**

November 2019

*Role of Residual Overturning for the Sensitivity of Southern Ocean Isopycnal Slopes***WHOI Physical Oceanography Seminar**

November 2019

Role of Residual Overturning for the Sensitivity of Southern Ocean Isopycnal Slopes

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., <i>Carbon Outgassing Hotspots in a Southern Ocean-Like Channel</i> . SOCCOM Annual Meeting, Princeton, NJ. June 2022, talk .	
Youngs, M. K., <i>Mixed-Shear Instability: What sets the momentum fluxes and why they matter</i> . 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**.