

XIAOTING YANG

24 Oxford Street, Cambridge, MA, USA, 02138

(+1) 857-707-6948 ◊ xiaoting_yang@g.harvard.edu ◊ www.xiaotingyang.com

EDUCATION

Harvard University

PhD candidate in Physical Oceanography
Department of Earth and Planetary Sciences

August 2016 - Present

Peking University (School of Physics)

Bachelor in Atmospheric and Oceanic Sciences with background in general physics

September 2012 - July 2016

RESEARCH

Dynamics of deep ocean eastern boundary currents

This is the core of my PhD project. The goal is to explain the local and large-scale dynamics of the deep ocean eastern boundary currents (DEBCs) whose presence has been repeatedly confirmed in observations, but whose theoretical understanding and numerical simulation have been incomplete.

- Analyzed the tracer distributions, and vorticity/buoyancy/momentum budgets associated with DEBCs in observations and state estimates. (Paper #1,2)
- Realistically simulated DEBCs and their vorticity dynamics in southeast Atlantic/Indian/Pacific Oceans using MITgcm. (#2)
- Performed idealized MITgcm simulations of the above DEBCs to isolate the main ingredients in their dynamics. (#4, 5)
- Built a semi-analytical simple vorticity model for DEBCs. Used this model to explain the importance of topography and eddy mixing in the dynamics of these DEBCs. (#4)
- Used an idealized eddy-resolving global model to explain the role of eddies in driving DEBCs. Used Lagrangian particles to study the trajectories of different water bodies. (#7)

Mid-depth Ocean Stratification: Southern Ocean versus interior dynamics

This is a secondary project as part of my PhD. The objective is to understand the interplay between Southern Ocean eddies and ocean interior mixing in determining the exponential interior mid-depth stratification.

- Studied how interior mixing and Southern Ocean eddies interact to determine the mid-depth stratification, with a series of eddy-permitting idealized two-hemisphere MITgcm configurations with various vertical mixing coefficient values in the interior. (#6)
- Studied how boundary-enhanced mixing can lead to exponential stratification consistent with the observed mid-depth temperature, and with tracer release experiments using low-resolution idealized MITgcm configurations. (#3)

Paleoclimate of the “Boring Billion” period

This is an unpublished undergraduate research project. The goal was to study the difference between present-day climate and the “Boring Billion” period, focusing on ocean circulation.

- Ran CCSM global simulations under present-day climate and paleoclimate configurations until steady state.
- Analyzed and compared the ocean circulation in these two simulations.

PUBLICATIONS

- [1] Xiaoting Yang, Eli Tziperman, and Kevin Speer. Dynamics of deep ocean eastern boundary currents. *Geophysical Research Letters*, 47(1):e2019GL085396, 2020. [pdf](#).
- [2] Xiaoting Yang, Eli Tziperman, and Kevin Speer. Deep eastern boundary currents: Realistic simulations and vorticity budgets. *Journal of Physical Oceanography*, 50(11):3077–3094, 2020. [pdf](#).
- [3] Madeline D Miller, Xiaoting Yang, and Eli Tziperman. Reconciling the observed mid-depth exponential ocean stratification with weak interior mixing and southern ocean dynamics via boundary-intensified mixing. *The European Physical Journal Plus*, 135(4):375, 2020. [pdf](#).
- [4] Xiaoting Yang, Eli Tziperman, and Kevin Speer. Deep eastern boundary currents: idealized models and dynamics. *Journal of Physical Oceanography*, 2021. [pdf](#).
- [5] Xiaoting Yang and Eli Tziperman. South atlantic deep eastern boundary current driven by agulhas rings: An idealized study. *Ocean Modelling*, page 101817, 2021. [pdf](#).
- [6] Xiaoting Yang and Eli Tziperman. Mid-depth ocean stratification: Southern ocean eddies vs interior vertical diffusivity. in preparation, 2021.
- [7] Xiaoting Yang, Eli Tziperman, and Kevin Speer. Dynamics of deep ocean eastern boundary currents: idealized global simulations. in preparation, 2021.

CONFERENCES AND MEETINGS

- Xiaoting Yang, Madeline Miller and Eli Tziperman, *Reconciling Weak Interior Mixing and Abyssal Recipes via Concentrated Boundary Mixing*, AGU 2016.
- Xiaoting Yang, Eli Tziperman and Kevin Speer, *The Deep Eastern Boundary Current in Southeastern Pacific Ocean*, Ocean Science Meeting 2018.
- Xiaoting Yang, Eli Tziperman and Kevin Speer, *Dynamics of Deep Eastern Boundary Currents*, AGU 2018.
- Xiaoting Yang, Eli Tziperman and Kevin Speer, *Dynamics of Deep Eastern Boundary Currents*, AOFD 2019.
- Xiaoting Yang, Eli Tziperman and Kevin Speer, *The Dynamics of Deep Ocean Eastern Boundary Currents*, Ocean Science Meeting, 2020.
- Xiaoting Yang, Eli Tziperman and Kevin Speer, *Dynamics of Deep Ocean Eastern Boundary Current*, AGU 2020.
- Pengcheng Zhang, Xiaoting Yang, John Wallace and Eli Tziperman, *New Insights into Dynamics of Coastal Low-level Jets*, AGU 2020.

AWARDS

- Distinction in Teaching, Harvard University, 2018
- Teaching Award of Department of Earth and Planetary Sciences, 2018
- Distinction in Teaching, Harvard University, 2020