Wenda Zhang

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Education

Doctor of Philosophy: Marine Science *2017 - 2022*
Stony Brook University Stony Brook, NY, U.S.
Advisor: Prof. Christopher L. P. Wolfe

Bachelor of Science: Marine Science *2013 - 2017*
Ocean University of China Qingdao, China

Research Interests

Ocean mesoscale eddies, and their impact on mixing, large-scale ocean circulations and climate; parameterization of mesoscale processes in ocean climate models, geophysical fluid dynamics; Lagrangian transport and mixing; idealized models.

Appointments

Postdoctoral Research Associate *2022-present*
Host: Dr. Stephen M. Griffies Princeton University
- Studying the vertical structure of mesoscale and submesoscale ocean eddies in idealized models, and developing parameterizations of this structure for use in global climate and prediction models.
- Implementing and improving the mesoscale kinetic energy backscatter parameterization in climate simulations of GFDL Modular Ocean Model (MOM6).

Research Assistant *2018-2022*
Advisor: Prof. Christopher L. P. Wolfe Stony Brook University
- Quantified potential vorticity (PV) transport due to coherent eddies and identified the relation between the PV diffusivity and dispersion of coherent eddies in a two-layer quasigeostrophic model.
- Analyzed the vertical structure of the mesoscale tracer diffusivity in an idealized ocean configuration of the MITgcm.

Undergraduate Researcher *2016 - 2017*
Supervisor: Prof. Xueen Chen Ocean University of China
- Diagnosed the energy transfer between mesoscale eddies and mean flows through barotropic and baroclinic pathways in the South China Sea based on the Global Hybrid Coordinate Ocean Model (HYCOM) hindcasts.

Publications

In Preparation

[1] **Zhang, W.**, A. Adcroft, E. Yankovsky, S.M. Griffies, R.W. Hallberg, 2024: A scale-dependent vertical structure for mesoscale energy backscatter parameterizations. *In preparation* for *Journal of Advances in Modeling Earth Systems*

[2] **Zhang, W.**, J. Steinberg, S.M. Griffies, R.W. Hallberg, 2024: Stratification constrains the horizontal scale of ocean mesoscale eddies. *In preparation* for *Journal of Physical Oceanography*.

Peer Reviewed

[1] **Zhang, W.**, S.M. Griffies, R.W. Hallberg, Y. Kuo, and C.L.P. Wolfe, 2024: The role of surface potential vorticity in the vertical structure of mesoscale eddies in wind-driven ocean circulations. *Journal of Physical Oceanography*, DOI: https://doi.org/10.1175/JPO-D-23-0203.1

[2] **Zhang, W.**, C.L.P. Wolfe, 2024: Inferring tracer diffusivity from coherent mesoscale eddies. *Journal of Advances in Modeling Earth Systems*, 16, e2023MS004004. https://doi.org/10.1029/2023MS004004

[3] **Zhang, W.**, C.L.P. Wolfe, 2022: On the vertical structure of oceanic mesoscale tracer diffusivities. *Journal of Advances in Modeling Earth Systems*, 14, e2021MS002891. https://doi. org/10.1029/2021MS002891

[4] **Zhang, W.**, C.L.P. Wolfe, R. Abernathey, 2020: Role of surface-layer coherent eddies in potential vorticity transport in quasi-geostrophic turbulence driven by eastward shear. *Fluids*, 5(1), p.2, doi: 10.3390/fluids5010002

Presentations

- "The role of surface potential vorticity in the vertical structure of mesoscale eddies", Ocean Sciences Meeting, New Orleans, LA, February 2024 (**oral presentation**)
- "A scale-dependent vertical structure for mesoscale energy backscatter parameterizations", CESM Ocean Model Working Group Meeting, Virtual, February 2024 (**oral presentation**)
- "Scale-dependent vertical structure of eddy kinetic energy in an adiabatic ocean model", Climate Process Team: Ocean Transport and Eddy Energy Annual Meeting, Woods Hole, MA, May 2023 (**oral presentation**)
- "Scale-dependent vertical structure of eddy kinetic energy in an idealized isopycnal ocean model", CESM Ocean Model Working Group Meeting, Virtual, February 2023 (**oral presentation**)
- "Inferring tracer diffusivity from coherent mesoscale eddies", 23rd Conference on Atmospheric and Oceanic Fluid Dynamics, Breckenridge, CO, June 2022 (**poster**)
- "On the vertical structure of oceanic mesoscale tracer diffusivities", Climate Process Team: Ocean Transport and Eddy Energy Annual Meeting, Boulder, CO, April 2022 (**oral presentation**)
- "What determines the vertical structure of mesoscale tracer diffusivity?", Ocean Sciences Meeting, Virtual, March 2022 (**oral presentation**)
- "Vertical structure of tracer diffusivity in an idealized basin circulation model", CESM Ocean Model Working Group Meeting, Virtual, February 2021 (**oral presentation**)
- "Diffusive versus nondiffusive properties of coherent ocean eddies", Ocean Sciences Meeting, San Diego, CA, February 2020 (**eLightning presentation**)
- "Role of coherent eddies in potential vorticity transport in two-layer quasigeostrophic turbulence", 22nd Conference on Atmospheric and Oceanic Fluid Dynamics, Portland, ME, June 2019 (**oral presentation**)

Teaching Experience

Teaching Assistant — *Stony Brook University*
Oceanography (MAR 104) — Fall 2017 and Fall 2018
Physics for Environmental Studies (ENS 119) — Spring 2018 and Spring 2021

Awards and Honors

2020	**Maze-Landeau Travel Award**, Stony Brook University
2019	**Distinguished Travel Award**, Stony Brook University
2019	**IACS Travel Award**, Stony Brook University
2016	**The Outstanding Student Award**, Ocean University of China
2016	**The Scholarship Award for Participation in Social Activities**, Ocean University of China
2015	**The First-Class Scholarship Award for Excellence in Academic Work**, Ocean University of China
2015	**Second Prize in Physics Competition of Chinese College Students (non-physics major)**, Chinese Physical Society
2014	**First Prize in Mathematics Competition of Chinese College Students (non-mathematics major)**, Chinese Mathematical Society

Volunteer Services

Journal Reviewer
Reviewer for Journal of Physical Oceanography, Journal of Advances in Modeling Earth Systems — 2022 - Present

NJ Ocean Fun Days — *Island Beach State Park*
Volunteer — May 2023

Workshop for Boys and Girls Club — *Mercer County, NJ*
Volunteer — March 2023

Qingdao Red Cross Society — *Qingdao, China*
Volunteer — June-July 2013

Programming Skills

Programming Python, Matlab
Computer Language Fortran