Yidongfang Si

MIT Green Bldg, #54-1613, Cambridge, MA 02139
y_si@mit.edu | https://siyidongfang.github.io

EMPLOYMENT

07/2025 – 02/2026 Postdoctoral Associate
Department of Earth, Atmospheric & Planetary Sciences
Massachusetts Institute of Technology
Host: Prof. Abigail Bodner

06/2023 – 06/2025 Houghton Postdoctoral Fellow
Department of Earth, Atmospheric & Planetary Sciences
Massachusetts Institute of Technology
Host: Prof. Raffaele Ferrari

EDUCATION

09/2018 – 06/2023 Department of Atmospheric and Oceanic Sciences, University of California, Los Angeles
Ph.D. in Atmospheric and Oceanic Sciences (*Jun 2023*)
M.S. in Atmospheric and Oceanic Sciences (*Dec 2020*)
Advisor: Prof. Andrew L. Stewart

09/2014 – 07/2018 School of Physics, Peking University
B.S. in Astronomy (*with honors*)

PUBLICATIONS

* = Corresponding Author, † = Student Advisees

Manuscripts in preparation:

1. **Y. Si**, L. Johnson, and A. Bodner*. Uncovering Ocean Mixed Layer Dynamics from the Sea Surface State. *In preparation for Geophysical Research Letters.* (Preprint available upon request)
2. **Y. Si**, G. Flierl, and R. Ferrari. Parametric Instability of a Tidal Flow in a Submarine Canyon. *In preparation for the Journal of Physical Oceanography.* (Preprint available upon request)
3. Z. Zhang et al. (including **Y. Si**). Water-Mass Exchanges between the Antarctic Continental Shelves and Open Ocean. *In preparation for Nature Reviews Earth & Environment*.

Submitted:

4. **Y. Si***, R. Ferrari, and G. Voet. Tidally Induced Turbulence in the Abyssal Ocean. *Submitted.*

5. M. K. Youngs*, A. L. Stewart, **Y. Si**, A. F. Thompson, and M. P. Schodlock. Quantifying climatic forcing versus meltwater feedbacks on the Antarctic Ice Shelf melt. *Nature Geoscience* (*In revision*).

Peer-reviewed:

6. S. Spungin*†, **Y. Si**, A. L. Stewart, and C. J. Prend. Observed Seasonality of Mixed-Layer Eddies and Vertical Heat Transport over the Antarctic Continental Shelf. *Journal of Geophysical Research: Oceans*, 2025. [doi, code] (†*Student co-advised by A.L. Stewart and Y. Si*)
7. X. Ruan*, **Y. Si**, and R. Ferrari. Diapycnal upwelling driven by tidally-induced mixing over steep topography. *Journal of Physical Oceanography*, 2025. [doi, pdf]
8. **Y. Si***, A. L. Stewart, A. Silvano, and A. C. Naveira Garabato. Antarctic slope undercurrent and onshore heat transport driven by ice shelf melting. *Science Advances*, 2024. [doi, pdf, code, data]
9. C. R. Schmidgall*†, **Y. Si**, A. L. Stewart, A. F. Thompson, and A. McC. Hogg. Dynamical controls on bottom water transport and transformation across the Antarctic Circumpolar Current. *Journal of Physical Oceanography*, 2023. [doi, pdf] (†*Student co-advised by A.L. Stewart and Y. Si*)
10. **Y. Si***, A. L. Stewart, and I. Eisenman. Heat transport across the Antarctic Slope Front controlled by cross-slope salinity gradients. *Science Advances*, 2023. [doi, pdf, code, data]
11. A. Silvano*, P. Holland, K. Naughten, O. Dragomir, P. Dutrieux, A. Jenkins, **Y. Si**, A. L. Stewart, B. Pena-Molino, G. Janzing, T. Dotto, and A. C. Naveira Garabato. Baroclinic ocean response to climate forcing regulates decadal variability of ice-shelf melting in the Amundsen Sea. *Geophysical Research Letters*, 2022. [doi]
12. **Y. Si***, A. L. Stewart, and I. Eisenman. Coupled ocean/sea ice dynamics of the Antarctic Slope Current driven by topographic eddy suppression and sea ice momentum redistribution. *Journal of Physical Oceanography*, 2022. [doi, pdf, code, data]
13. **Y. Si**, J. Yang*, and Y. Liu. Planetary climate under extremely high vertical diffusivity. *Astronomy & Astrophysics*, 2022. [doi, pdf, code]

Non Peer Reviewed:

- Y. Si. Ice-Ocean Interactions in the Antarctic Slope Current. *Ph.D. Dissertation*, University of California, Los Angeles, 2023. [online]
- Y. Si. Tides, Oceans, and Climate on Exoplanets. *B.S. Thesis*, Peking University, 2018.

SELECTED AWARDS

11/2025	NSFC Excellent Young Scientists Fund (Overseas) 优秀青年科学基金 (海外)
06/2023 – 06/2025	MIT Distinguished Postdoctoral Fellowship in Earth, Atmospheric & Planetary Sciences

01/2024	UCLA Jacob A. Bjerknes Award
10/2022 – 06/2023	UCLA Dissertation Year Fellowship
09/2018 – 08/2022	China Scholarship Council Fellowship
2015 – 2018	Beijing Outstanding Graduate Award Peking University: May 4th Scholarship, Social Work Award, Outstanding Graduate Award School of Physics: Wei-Ming Scholarship, Outstanding Bachelors Thesis

RESEARCH SUPPORT

03/2026 – 03/2029	Ice-Ocean Interactions in the Polar Oceans (PI, NSFC Excellent Young Scientists Fund)
08/2023 – 02/2026	Tidally Induced Turbulence over Sloping Topography (Project Lead, NCAR Large Allocation, 19.3 million CPU hours + 17,500 GPU hours + 70 TB storage)

SERVICE

Jan 12–15, 2026	*Introduction to Physical Oceanography*, Workshop for Undergraduate Research (73 students), Department of Atmospheric and Oceanic Sciences, School of Physics, Peking University
Dec 9–13, 2024	Co-convener for the AGU Annual Meeting Session: *Ice-Ocean interactions along Antarcticas Continental Shelf*
Since 2022	Reviewer for the *Journal of Physical Oceanography*, *Journal of Geophysical Research: Oceans*, *Journal of Climate*, and *Earth's Future.*

MENTORSHIP

03/2022 – 06/2023	Sophia Spungin, undergraduate researcher (Co-advised by Prof. Andrew Stewart), UCLA
01/2020 – 03/2022	Carlyn Schmidgall, undergraduate researcher (Co-advised by Prof. Andrew Stewart), UCLA

TEACHING

2019 – 2021	Teaching Assistant/Associate, UCLA AOS 103, Physical Oceanography
Spring 2019	Teaching Assistant, UCLA AOS 2, Air Pollution

ABSTRACTS (PRESENTER)

- *What Triggers Intense Turbulent Overturns in the Abyssal Ocean? An Integrated Perspective from Observations, Simulations, and Theory.* Department of Atmospheric and Oceanic Sciences, School of Physics, Peking University, Jan 24, 2025. (Seminar)
- *Ocean Heat Transport and Antarctic Ice Shelf Melt: Two Positive Feedback Mechanisms,* School of Oceanography, Shanghai Jiao Tong University, Jan 2, 2025. (Seminar)

- *Tidally-Induced Turbulence over Sloping Topography,* AGU Annual Meeting, Washington, D.C., Dec 9-13, 2024. (Talk)
- *Tidally-Induced Turbulence over Sloping Topography,* Ocean Mixing Gordon Research Conference, South Hadley, MA, Jun 9-14, 2024. (Poster)
- *Ocean Heat Transport and Antarctic Ice Shelf Melt: Two Positive Feedback Mechanisms,* Department of Atmospheric and Oceanic Sciences, School of Physics, Peking University, Jan 3, 2024. (Seminar)
- *Antarctic slope undercurrent and onshore heat transport driven by ice shelf melting,* 2nd US Antarctic Science Meeting, Jun 20-23, 2023. (Talk)
- *Antarctic slope undercurrent and onshore heat transport driven by meltwater upwelling,* Climate Dynamics Group, Jun 6, 2023. (Seminar)
- *Interactions between Antarctic continental shelf/slope circulation and ice shelf melt,* Department of Atmospheric & Oceanic Sciences, UCLA, Apr 5, 2023. (Seminar)
- *Drivers of the West Antarctic Undercurrent and Heat Transport toward Ice Shelves,* AGU Fall Meeting, Chicago, IL, Dec 11-16, 2022. (Poster)
- *Toward Circumpolar Regional Modeling of "Hot Spots" in Onshore Ocean Heat Transport,* AGU Fall Meeting, Chicago, IL, Dec 11-16, 2022. (Poster)
- *Heat transport across the Antarctic Slope Front,* Scientific Committee on Antarctic Research (SCAR) Meeting, Aug 1-10, 2022. (Talk)
- *Heat transport across the Antarctic Slope Front controlled by cross-slope salinity gradients,* the 23rd Conference on Atmospheric and Oceanic Fluid Dynamics, Breckenridge, CO, Jun 13-17, 2022. (Talk)
- *Coastal freshening enhances eddy-driven heat transfer toward the Antarctic margins,* AGU Ocean Sciences Meeting, Feb 24-Mar 4, 2022. (Talk)
- *Coastal freshening enhances eddy-driven heat transfer toward the Antarctic margins,* Peking University-Fudan University AOS Symposium, Jan 14, 2022. (Seminar)
- *Heat transport across the Antarctic Slope Front controlled by cross-slope salinity gradients,* Alfred Wegener Institute, Helmholtz Centre for Polar and Marine Research, Nov 3, 2021. (Seminar)
- *Heat transport across the Antarctic Slope Front controlled by cross-slope salinity gradients,* California Geophysical Fluid Dynamics (CalGFD) Meeting, Sep 2-3, 2021. (Talk)
- *Heat transport across the Antarctic Slope Front controlled by cross-slope salinity gradients,* US Antarctic Science Meeting (US-SCAR), Jul 12-15, 2021. (Talk)
- *Coupled ocean/sea ice circulation in the Antarctic Slope Current due to topographic eddy suppression and sea ice momentum redistribution,* Climate Dynamics Group, Apr 10, 2021. (Seminar)

- *Coupled ocean/sea ice circulation in the Antarctic Slope Current due to topographic eddy suppression and sea ice momentum redistribution,* Antarctic Margins Meeting at ANU, UNSW, and CSIRO, Mar 29, 2021. (Seminar)
- *What drives the ice-ocean system in the Antarctic Slope Current?* California Geophysical Fluid Dynamics (CalGFD) Meeting, Aug 20-21, 2020. (Talk)
- *Role of Tides in Ice-Ocean Interactions Over the Antarctic Continental Shelf and Slope,* AGU Ocean Sciences Meeting, San Diego, CA, Feb 16-21, 2020. (Poster)
- *Warming asynchronously rotating planets around low-mass stars by strong ocean tidal mixing,* the 5th Conference on Earth System Science, Shanghai, Jul 2-4, 2018. (Poster)
- *Tide, Ocean and Climate on Exoplanets,* AGU Fall Meeting, New Orleans, LA, Dec 11-15, 2017. (Poster)
- *Exploring the Dynamics Linking Arctic Melting to Eurasian Cold Winters from 1911 to 1940,* the 34th Chinese Meteorological Society Annual Meeting*,* Zhengzhou, Sep 26-29, 2017. (Talk)