Qing Li

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Fluid Dynamics and Solid Mechanics
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Education

2018 **Ph.D. Earth, Environment and Planetary Sciences**,
Brown University, Providence, RI, USA
Advisor: B. Fox-Kemper
PhD thesis: *Langmuir Turbulence and Its Effects on Global Climate*

2013 **M. S. Meteorology**, Peking University, Beijing, China
Advisor: H. Yang
Master's thesis: *Numerical Simulations of a Fully Coupled Aqua-Planet: Mean Climate and Meridional Heat Transport*

2010 **B. S. Atmospheric Sciences**, Peking University, Beijing, China
Senior thesis advisor: H. Yang
Senior thesis: *Lagrangian Analysis on the Circulation in the Pacific Ocean*

2010 **B. S. Double Major in Economics**, Peking University, Beijing, China

Research Interests

Planetary boundary layer turbulence, Ocean surface waves, Numerical modeling, Climate sciences

Research Experience

2018 - **Postdoctoral Research Associate**, Los Alamos National Laboratory,
Los Alamos, NM, USA
Fluid Dynamics and Solid Mechanics, Theoretical Division

2013 - 2018 **Research Assistant**, Brown University, Providence, RI, USA
Dept. of Earth, Environmental and Planetary Sciences
The Institute at Brown for Environment and Society (IBES)

2010 - 2013 **Research Assistant**, Peking University, Beijing, China
Dept. of Atmospheric and Oceanic Sciences, School of Physics

Teaching Experience

2020 Summer **Student Mentor**, Los Alamos National Laboratory
Parallel Computing Summer Research Internship with L. Van Roekel and M. Turner

2017 Fall **Teaching Assistant**, Brown University
Principles of Planetary Climate under J.-E. Lee

2017 Spring **Guest Lecturer**, Brown University
Ocean Circulation and Climate under B. Fox-Kemper

2016 Fall **Guest Lecturer**, Brown University
Mathematical Methods of Fluid and Solid Geophysics and Geology under B. Fox-Kemper

2016 Fall **Teaching Assistant**, Brown University
Mathematical Methods of Fluid and Solid Geophysics and Geology under B. Fox-Kemper

2015 - 2016	**Sheridan Teaching Certificate I**, Brown University
2010 Fall	**Teaching Assistant**, Peking University *Fluid Dynamics* under G. Xin

Awards and Grants

2019	**Travel Support:** Visit to National Center for Atmospheric Research, Boulder, CO, USA
2018 - 2020	**Computing Grant:** Institutional Computing at LANL. Q. Li and L. Van Roekel, *Better Understanding of the Air-Sea Fluxes Using Atmosphere-Ocean Coupled Large Eddy Simulation*, 7 Mcpuhr. + 40.9 TB storage
2018	**Travel Support:** Physical Oceanography Dissertation Symposium X, Kailua-Kona, HI, USA
2016	**Travel Support:** CLIVAR Open Science Conference, Qingdao, China
2016	**Travel Support:** Liège Colloquium on Submesoscale Processes: Mechanisms, Implications and new Frontiers, Liège, Belgium
2015 - 2016	**Fellowship:** IBES Graduate Student Fellowship
2014	**Travel Support:** Institute for Mathematics and its Applications Workshop on Impact of Waves Along Coastlines, Minneapolis, MN, USA
2014	**Travel Support:** The Community Earth System Model Tutorial, Boulder, CO, USA
2013 - 2014	**Fellowship:** First-Year Graduate Student Fellowship

Service to the Profession and Academic Literature

2020	**Session Co-Chair:** with Ivan Savelyev, Gregory Wagner and Leah Johnson, Ocean Sciences Meeting, AGU/ASLO/TOS, San Diego, CA, USA. *Session: Turbulent mixing of the ocean surface boundary layer: Observation, Simulation, and Parameterization*
2018	**Session Chair:** KITP Conference on Frontiers in Oceanic, Atmospheric, and Cryospheric Boundary Layers, Santa Barbara, CA, USA. *Session: Interdisciplinary*
2015	**Student Volunteer:** Abstract sorting for 68th Annual Division of Fluid Dynamics Meeting, APS, Boston, MA, USA

Reviewer: Acta Oceanologica Sinica, Deep-Sea Research Part I: Oceanographic Research Papers, Geophysical Research Letters, Geoscientific Model Development, Journal of Advances in Modeling Earth Systems, Journal of Climate, Journal of Computational Physics, Journal of Geophysical Research: Atmospheres, Journal of Geophysical Research: Oceans, Journal of Physical Oceanography, Marine Geodesy, Ocean Dynamics, Ocean Modelling

Member: American Geophysical Union, American Meteorological Society

Publications

[A.1] **Q**. **Li**, B. Fox-Kemper, Anisotropy of Langmuir turbulence and the Langmuir-enhanced mixed layer entrainment, Physical Review Fluids 5 (1) (2020) 013803. doi:10.1103/PhysRevFluids.5.013803.

[A.2] P. M. Caldwell, A. Mametjanov, Q. Tang, L. P. Van Roekel, J.-C. Golaz, W. Lin, D. C. Bader, N. D. Keen, Y. Feng, R. Jacob, M. E. Maltrud, A. F. Roberts, M. A. Taylor, M. Veneziani, H. Wang, J. D. Wolfe, K. Balaguru, P. Cameron-Smith, L. Dong, S. A. Klein, L. R. Leung, H.-Y. Li, **Q**. **Li**, X. Liu, R. B. Neale, M. Pinheiro, Y. Qian, P. A. Ullrich, S. Xie, Y. Yang, Y. Zhang, K. Zhang, T. Zhou, The DOE E3SM coupled model version 1: Description and results at high resolution, Journal of Advances in Modeling Earth Systems 11 (12) (2019) 4095–4146. doi:10.1029/2019MS001870.

[A.3] **Q**. **Li**, B. G. Reichl, B. Fox-Kemper, A. Adcroft, S. Belcher, G. Danabasoglu, A. Grant, S. M. Griffies, R. W. Hallberg, T. Hara, R. Harcourt, T. Kukulka, W. G. Large, J. C. McWilliams, B. Pearson, P. Sullivan, L. Van Roekel, P. Wang, Z. Zheng, Comparing ocean surface boundary vertical mixing schemes

including Langmuir turbulence, Journal of Advances in Modeling Earth Systems 11 (11) (2019) 3545–3592. doi:10.1029/2019MS001810.

[A.4] B. G. Reichl, **Q**. **Li**, A parameterization with a constrained potential energy conversion rate of vertical mixing due to Langmuir turbulence, Journal of Physical Oceanography 49 (11) (2019) 2935–2959. doi:10.1175/JPO-D-18-0258.1.

[A.5] A. B. Villas Boas, F. Ardhuin, A. Ayet, M. A. Bourassa, B. Chapron, P. Brandt, B. D. Cornuelle, J. T. Farrar, M. R. Fewings, B. Fox-Kemper, S. T. Gille, C. Gommenginger, P. Heimbach, M. C. Hell, **Q**. **Li**, M. Mazloff, S. T. Merrifield, A. Mouche, M.-H. Rio, E. Rodriguez, J. D. Shutler, A. C. Subramanian, E. J. Terrill, M. Tsamados, C. Ubelmann, E. van Sebille, Integrated observations and modeling of global winds, currents, and waves: Requirements and challenges for the next decade, Frontiers in Marine Science 6 (2019) 425. doi:10.3389/fmars.2019.00425.

[A.6] **Q**. **Li**, B. Fox-Kemper, Assessing the effects of Langmuir turbulence on the entrainment buoyancy flux in the ocean surface boundary layer, Journal of Physical Oceanography 47 (12) (2017) 2863–2886. doi:10.1175/JPO-D-17-0085.1.

[A.7] **Q**. **Li**, B. Fox-Kemper, Ø. Breivik, A. Webb, Statistical models of global Langmuir mixing, Ocean Modelling 113 (2017) 95–114. doi:10.1016/j.ocemod.2017.03.016.

[A.8] **Q**. **Li**, A. Webb, B. Fox-Kemper, A. Craig, G. Danabasoglu, W. G. Large, M. Vertenstein, Langmuir mixing effects on global climate: WAVEWATCH III in CESM, Ocean Modelling 103 (2016) 145–160. doi:10.1016/j.ocemod.2015.07.020.

[A.9] H. Yang, K. Wang, H. Dai, Y. Wang, **Q**. **Li**, Wind effect on the Atlantic meridional overturning circulation via sea ice and vertical diffusion, Climate Dynamics 46 (11) (2016) 3387–3403. doi:10.1007/s00382-015-2774-z.

[A.10] H. Yang, Y. Zhao, Z. Liu, **Q**. **Li**, F. He, Q. Zhang, Heat transport compensation in atmosphere and ocean over the past 22,000 years, Scientific Reports 5 (2015) 16661. doi:10.1038/srep16661.

[A.11] H. Yang, **Q**. **Li**, K. Wang, Y. Sun, D. Sun, Decomposing the meridional heat transport in the climate system, Climate Dynamics 44 (9) (2015) 2751–2768. doi:10.1007/s00382-014-2380-5.

Publications In Progress

[M.1] **Q**. **Li**, L. Van Roekel, Towards multiscale modeling of ocean surface turbulent mixing using coupled MPAS-Ocean v6.3 and PALM v5.0, Geoscientific Model Development, In review (2021). doi:10.5194/gmd-2020-262.

[M.2] **Q**. **Li**, J. Bruggeman, H. Burchard, K. Klingbeil, L. Umlauf, K. Bolding, Integrating CVMix into GOTM (v6.0): A consistent framework for testing, comparing, and applying ocean mixing schemes, Geoscientific Model Development, In review (2021). doi:10.5194/gmd-2020-437.

[M.3] **Q**. **Li**, B. G. Reichl, B. Fox-Kemper, L. Van Roekel, Uncertainties in modeling the ocean surface vertical mixing: Mixing physics versus surface forcing, In preparation.

Conference Presentations

[P.1] **Q**. **Li**, L. Van Roekel, Towards multiscale modeling of ocean surface turbulent mixing using coupled MPAS-Ocean and PALM, in: Ocean Sciences Meeting, AGU/ASLO/TOS, San Diego, CA, USA, 2020, Poster.

[P.2] **Q**. **Li**, Modeling the ocean surface boundary layer vertical mixing by Langmuir turbulence, in: 9th Warnemünde Turbulence Days (WTD) on Ocean Mixing and its Efficiency, Putbus, Germany, 2019, Talk (Invited).

[P.3] **Q. Li**, L. Van Roekel, P. Caldwell, J.-C. Golaz, M. Maltrud, A. Mametjanov, Q. Tang, J. Wolfe, Labrador Sea air-sea fluxes, circulation, and sea-ice in High-Res and Low-Res E3SM, in: 22nd Conference on Atmospheric and Oceanic Fluid Dynamics, AMS, Portland, ME, USA, 2019, Poster.

[P.4] **Q. Li**, B. G. Reichl, B. Fox-Kemper, A. Adcroft, S. Belcher, G. Danabasoglu, A. Grant, S. M. Griffies, R. W. Hallberg, T. Hara, R. Harcourt, T. Kukulka, W. G. Large, J. C. McWilliams, B. Pearson, P. Sullivan, L. Van Roekel, P. Wang, Z. Zheng, Comparing ocean boundary vertical mixing schemes with Langmuir turbulence, in: Fall Meeting, AGU, Washington, DC, USA, 2018, Talk.

[P.5] **Q. Li**, Langmuir turbulence and its effects on global climate, in: Physical Oceanography Dissertation Symposium X, Kailua-Kona, HI, USA, 2018, Talk.

[P.6] **Q. Li**, B. Fox-Kemper, Anisotropy of Langmuir turbulence and the entrainment buoyancy flux, in: Gordon Research Conference on Ocean Mixing, Andover, NH, USA, 2018, Poster.

[P.7] **Q. Li**, B. Fox-Kemper, Anisotropy of Langmuir turbulence and the entrainment buoyancy flux, in: Ocean Sciences Meeting, AGU/ASLO/TOS, Portland, OR, USA, 2018, Poster.

[P.8] **Q. Li**, B. Fox-Kemper, Surface wind wave induced entrainment at the base of the ocean surface boundary layer, in: Open Science Conference, CLIVAR, Qingdao, China, 2016, Poster.

[P.9] **Q. Li**, B. Fox-Kemper, T. Arbetter, A. Webb, Ø. Breivik, A. Craig, G. Danabasoglu, W. G. Large, M. Vertenstein, A statistical modeling of the Langmuir mixing effects on the global climate, in: 21st CESM Workshop, NCAR, Breckenridge, CO, USA, 2016, Talk.

[P.10] **Q. Li**, A. Webb, B. Fox-Kemper, T. Arbetter, A. Craig, G. Danabasoglu, W. G. Large, M. Vertenstein, A statistical modeling of the Langmuir mixing effects on global climate, in: 48th International Liège Colloquium On Ocean Dynamics, University of Liège, Liège, Belgium, 2016, Poster.

[P.11] **Q. Li**, A. Webb, B. Fox-Kemper, T. Arbetter, A. Craig, G. Danabasoglu, W. G. Large, M. Vertenstein, Langmuir mixing affects the global climate: A statistical modeling, in: Ocean Sciences Meeting, AGU/ASLO/TOS, New Orleans, LA, USA, 2016, Talk.

[P.12] **Q. Li**, A. Webb, B. Fox-Kemper, A. Craig, G. Danabasoglu, W. G. Large, M. Vertenstein, Langmuir mixing effects on global climate: WAVEWATCH III in CESM, in: 68th Annual Division of Fluid Dynamics Meeting, APS, Boston, MA, USA, 2015, Poster.

[P.13] **Q. Li**, A. Webb, B. Fox-Kemper, A. Craig, G. Danabasoglu, W. G. Large, M. Vertenstein, Langmuir mixing effects on global climate: WAVEWATCH III in CESM, in: 4th COWCLIP Workshop, Paris, France, 2015, Talk.

[P.14] **Q. Li**, A. Webb, B. Fox-Kemper, A. Craig, G. Danabasoglu, W. G. Large, M. Vertenstein, Langmuir mixing in CESM, in: 20th CESM Workshop, NCAR, Breckenridge, CO, USA, 2015, Talk.

[P.15] **Q. Li**, A. Webb, B. Fox-Kemper, A. Craig, G. Danabasoglu, W. G. Large, M. Vertenstein, Langmuir mixing effects on global climate: WAVEWATCH III in CESM, in: Fall Meeting, AGU, San Francisco, CA, USA, 2014, Poster.

[P.16] **Q. Li**, A. Webb, B. Fox-Kemper, A. Craig, G. Danabasoglu, W. G. Large, M. Vertenstein, Langmuir mixing effects on global climate: WAVEWATCH III in CESM, in: Workshop on the Impact of Waves Along Coastlines, IMA, University of Minnesota, Minneapolis, MN, USA, 2014, Poster.

[P.17] **Q. Li**, B. Fox-Kemper, T. Arbetter, A. Webb, Assessing the influence of surface wind waves to the global climate by incorporating WAVEWATCH III in CESM: Langmuir mixing in KPP, in: 19th CESM Workshop, NCAR, Breckenridge, CO, USA, 2014, Talk.

[P.18] **Q. Li**, B. Fox-Kemper, T. Arbetter, A. Webb, Assessing the influence of surface wind waves to the global climate by incorporating WAVEWATCH III in CESM, in: Ocean Sciences Meeting, AGU/ASLO/TOS, Honolulu, HI, USA, 2014, Poster.