李庆

地球与海洋大气科学学域
香港科技大学（广州）
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教育背景

2018 美国布朗大学地球、环境与行星科学博士学位
导师：B. Fox-Kemper
博士论文：*Langmuir Turbulence and Its Effects on Global Climate*
2013 北京大学气象学硕士学位
导师：杨海军
硕士论文：水球世界气候态与经向的耦合模式研究
2010 北京大学大气科学学士学位
导师：杨海军
学士论文：基于拉格朗日方法的太平洋海洋环流研究
2010 北京大学经济学双学位

研究兴趣

行星边界层湍流，海浪，海洋数值模拟，气候科学

科研经历

2021 - 助理教授，香港科技大学（广州）功能枢纽地球与海洋大气科学学域
2021 - 附属助理教授，香港科技大学理学院海洋科学系
2018 - 2021 博士后研究员，美国洛斯阿拉莫斯国家实验室
2013 - 2018 研究助理，美国布朗大学地球、环境与行星科学系/布朗大学环境与社会研究院
2010 - 2013 研究助理，北京大学物理学院大气与海洋科学系

教学经历

2022 春 客座讲师，香港科技大学（广州）
Introduction to Function Hub for Sustainable Future
2021 秋 讲师，香港科技大学（广州）
Ocean Circulation, Carbon Cycle, Ecosystems, and Changing Climate（与吉启星和余柳倩合作）
2021 秋 客座讲师，香港科技大学（广州）
Professional Development for Function Hub
2020 夏 学生导师，美国洛斯阿拉莫斯国家实验室
并行计算暑期研究实习（与 L. Van Roekel 和 M. Turner 共同指导）
2017 秋 助教，布朗大学
Principles of Planetary Climate（教授：J.-E. Lee）
2017 春 客座讲师，布朗大学
Ocean Circulation and Climate（教授：B. Fox-Kemper）
2016 秋 客座讲师，布朗大学
Mathematical Methods of Fluid and Solid Geophysics and Geology（教授：B. Fox-Kemper）
2016 秋 助教, 布朗大学

Mathematical Methods of Fluid and Solid Geophysics and Geology（教授：B. Fox-Kemper）

2015 - 2016 布朗大学 Harriet W. Sheridan 教学中心 Sheridan Teaching Certificate I

2010 秋 助教，北京大学
流体力学（教授：辛国君）

奖励与资助

2022 - 2023 科研经费：港澳海洋研究中心 2022 科研项目
Q. Li, *Modeling the Ocean Boundary Layer Turbulent Mixing: From Open Oceans to Coastal Oceans*

2019 差旅资助：访问美国国家大气研究中心（NCAR）

2018 - 2020 课题机时资助：美国洛斯阿拉莫斯国家实验室
Q. Li and L. Van Roekel, *Better Understanding of the Air-Sea Fluxes Using Atmosphere-Ocean Coupled Large Eddy Simulation*, 7 M 计算机机时 + 40.9 TB 数据存储空间

2018 学术会议差旅资助：Physical Oceanography Dissertation Symposium X, Kailua-Kona, HI, USA

2016 学术会议差旅资助：CLIVAR Open Science Conference, Qingdao, China

2016 学术会议差旅资助：Liège Colloquium on Submesoscale Processes: Mechanisms, Implications and new Frontiers, Liège, Belgium

2015 - 2016 布朗大学环境与社会研究院奖学金

2014 学术会议差旅资助：Institute for Mathematics and its Applications Workshop on Impact of Waves Along Coastlines, Minneapolis, MN, USA

2014 差旅资助：The Community Earth System Model Tutorial, Boulder, CO, USA

2013 - 2014 布朗大学新生奖学金

学术兼职

2020 学术会议分会组织者和主持人（与 Ivan Savelyev，Gregory Wagner 和 Leah Johnson 共同组织和主持）
Ocean Sciences Meeting（分会主题：*Turbulent mixing of the ocean surface boundary layer: Observation, Simulation, and Parameterization*）

2018 学术会议分会主持人
KITP Conference on Frontiers in Oceanic, Atmospheric, and Cryospheric Boundary Layers（分会主题：*Interdisciplinary*）

2015 学术会议学生志愿者（协助整理摘要和安排日程）
American Physical Society 68th Annual Division of Fluid Dynamics Meeting

审稿人：National Science Foundation, 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 Atmospheric and Oceanic Technology, Journal of Climate, Journal of Computational Physics, Journal of Geophysical Research: Atmospheres, Journal of Geophysical Research: Oceans, Journal of Physical Oceanography, Journal of Turbulence, Marine Geodesy, Ocean Dynamics, Ocean Modelling

会员：美国地球物理学会，美国气象学会

发表论文

[A.1] X. Zheng, **Q**. **Li**, T. Zhou, Q. Tang, L. Van Roekel, J.-C. Golaz, Description of historical and future projection simulations by the global coupled E3SMv1.0 model as used in CMIP6, Geoscientific Model Development, Accepted (2022).

[A.2] P. Orenstein, B. Fox-Kemper, L. Johnson, **Q**. **Li**, A. Sane, Evaluating coupled climate model parameterizations via skill at reproducing the monsoon intraseasonal oscillation, Journal of Climate 35 (6) (2022) 1873–1884. doi:10.1175/JCLI-D-21-0337.1.

[A.3] **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 14 (7) (2021) 4261–4282. doi:10.5194/gmd-14-4261-2021.

[A.4] **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 14 (4) (2021) 2011–2028. doi:10.5194/gmd-14-2011-2021.

[A.5] **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.6] 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.7] **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.8] 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.9] 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.10] **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.11] **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.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, Ocean Modelling 103 (2016) 145–160. doi:10.1016/j.ocemod.2015.07.020.

[A.13] 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.14] 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.15] 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.

待发表论文

[M.1] A. Garanaik, K. Smith, R. Robey, **Q**. **Li**, B. Pearson, L. Van Roekel, A new hybrid mass-flux/high-order turbulence closure for ocean vertical mixing, Journal of Advances in Modeling Earth Systems, Submitted (2022).

[M.2] M. Shao, Y. Wang, **Q**. **Li**, J. Zhao, X. Chai, Saildrone-observed submesoscale air-sea turbulent heat and momentum fluxes in the southern ocean, Geophysical Research Letters, Submitted (2022).

[M.3] C. Zhu, J. Zhang, Z. Liu, B. Otto-Bliesner, C. He, E. Brady, R. Tomas, Q. Wen, **Q**. **Li**, C. Zhu, S. Zhang, L. Wu, Antarctic warming during Heinrich Stadial 1 in a transient isotope-enabled deglacial simulation, Journal of Climate, Submitted (2022).

[M.4] H. Pham, S. Sarkar, L. Johnson, B. Fox-Kemper, P. Sullivan, **Q**. **Li**, Multi-scale variability of turbulent mixing during a monsoon intraseasonal oscillation in the Bay of Bengal: an LES study, Journal of Geophysical Research - Oceans, Submitted (2022).

学术会议报告

[P.1] **Q**. **Li**, L. Van Roekel, S. Stevenson, Tropical instability waves in a warmer climate simulated in the energy exascale earth system model, in: Ocean Sciences Meeting, Virtual Meeting Online, 2022, Talk.

[P.2] **Q**. **Li**, Modeling the turbulent mixing in coastal oceans, in: CORE Annual Research Symposium, Virtual Meeting Online, 2022, Talk.

[P.3] **Q**. **Li**, J. Bruggeman, H. Burchard, K. Klingbeil, L. Umlauf, K. Bolding, Integrating CVMix into GOTM: A consistent framework for testing, comparing, and applying ocean mixing schemes, in: 10th Warnemünde Turbulence Days (WTD) on Interfaces and turbulent boundary layers, Virtual Meeting Online, 2021, Talk.

[P.4] **Q**. **Li**, L. Van Roekel, Towards multi-scale modeling of ocean surface turbulent mixing using coupled MPAS-Ocean and PALM, in: 1st IAMES Conference, International Association of Meteorological Education and Sciences (IAMES), Virtual Meeting Online, 2021, Talk.

[P.5] **Q**. **Li**, An update on Langmuir mixing parameterizations in CESM2.2, in: CESM Ocean Model Working Group Meeting, NCAR, Virtual Meeting Online, 2021, Talk.

[P.6] **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.7] **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.8] **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.9] **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.10] **Q**. **Li**, Langmuir turbulence and its effects on global climate, in: Physical Oceanography Dissertation Symposium X, Kailua-Kona, HI, USA, 2018, Talk.

[P.11] **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.12] **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.13] **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.14] **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.15] **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.16] **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.17] **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.18] **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.19] **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.20] **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.21] **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.22] **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.23] **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.

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