Lixin Qu

Stanford University
Department of Earth System Science
473 Via Ortega Y2E2 Bldg
Stanford, CA 94305

Office: Y2E2 Building, Room 170
Email: lixinqu@stanford.edu
Web: lixinqu.github.io

Education

Ph.D. Oceanography, Texas A&M University, 08/2014–08/2019.

M.Sc. Physical Oceanography, Ocean University of China, 08/2011–06/2014.

Study Abroad: University of Bremen and University of Kiel, Germany.

B.Sc. Information and Computing Science, Ocean University of China, 08/2007–06/2011.

Academic Exchange (one year): School of Mathematics, Shandong University, China.

Research Experience

Stanford University, Department of Earth System Science

Postdoctoral Research Fellow, 10/2019–present.

Texas A&M University, Department of Oceanography

Postdoctoral Research Associate, 08/2019–10/2019.

Graduate Research Assistant, 08/2014–08/2019.

Ocean University of China, College of Oceanic and Atmospheric Sciences

Graduate Research Assistant, 08/2011–06/2014.

Research Interests

Bottom mixing and turbulence; Submesoscale processes; Near-inertial waves; Numerical simulations of flow in coastal environments; Impacts of fluid dynamics on marine ecology and biology

Research

Publications

Refereed Publications

Qu, L., L. Thomas, and R. Hetland (R&R). Near-inertial wave critical layers over sloping bathymetry. *Journal of Physical Oceanography*. ArXiv:2009.02460 [physics.ao-ph].

Xomchuk, V., R. Hetland, and **L. Qu** (Accepted). Small-scale variability of bottom oxygen in the northern Gulf of Mexico. *Journal of Geophysical Research: Oceans*. doi:10.1029/2020JC016279.

Thyng, K., D. Kobashi, V. Xomchuk, **L. Qu**, X. Chen, and R. Hetland. Performance of offline passive tracer advection in ROMS (Accepted). *Geoscientific Model Development*. https://doi.org/10.5194/gmd-2020-221.

Qu, L. and R. Hetland (2020). Non-geostrophic baroclinic instability over sloping bathymetry: buoyant flow regime. *Journal of Physical Oceanography*, 50(7), 1937-1956. doi:10.1175/JPO-D-19-0145.1.

Qu, L. and R. Hetland (2019). Temporal resolution of wind forcing required for river plume prediction. *Journal of Geophysical Research: Oceans*, 124(3), 1459-1473. doi:10.1029/2018JC014593.

Qu, L., X. Lin, R. Hetland, and J. Guo (2018). The asymmetric continental shelf wave in response to the synoptic wind burst in a semienclosed double-shelf basin. *Journal of Geophysical Research: Oceans*, 123(1), 131-148. doi:10.1002/2017JC013025.

Qu, L. and X. Lin (2014). The effect of the continental shelf slope around an island on the Island Rule. *Journal of Ocean University of China*, 44 (Sup.), 001-006.

Manuscripts in Preparation

Qu, L., R. Hetland, L. Thomas, and V. Xomchuk. Near-inertial waves in a baroclinic vortex.

Qu, L., L. Thomas, J. Gula, and J. MacKinnon. Bottom mixing modulated by near-inertial waves in the Straits of Florida.

Qu, L., L. Thomas, R. Hetland, and D. Kobashi. Modulation of bottom hypoxic water in Northern Gulf of Mexico by near-inertial waves.

Other and Products

Qu, L. (2019). Submesoscale vortices and near-inertial waves in coastal buoyancy-driven flow (Doctoral dissertation). https://oaktrust.library.tamu.edu/handle/1969.1/186420

Qu, L. and T. Zu (2017). "Northern South China Sea Forecast System," An operational high-resolution ocean forecast model on the northern shelf of South China Sea. http://barataria.tamu.edu:8080/NSCS

Qu, L. (2014). The oceanic responses to synoptic wind bursts in the Yellow Sea and Bohai Sea (Master's thesis). http://cdmd.cnki.com.cn/Article/CDMD-10423-1014329439.htm

Conference and Seminar Presentations

L. Qu , L. Thomas, R. Hetland, J. Gula, and J. MacKinnon, "Linking bottom mixing to near-inertial waves over sloping bathymetry," Applied Ocean Physics & Engineering Seminar, Woods Hole Oceanographic Institution, October 14, 2020. (talk)

L. Qu , L. Thomas, and R. Hetland, "Critical reflection of near-inertial waves over sloping bathymetry," CalGFD Virtual Conference, CA, August 20-21, 2020. (talk)

L. Qu , L. Thomas, and R. Hetland, "Enhanced bottom mixing due to trapped near inertial waves over sloping bathymetry," Environmental Fluid Mechanics Laboratory Seminar, Stanford University, August 20, 2020. (talk)

L. Qu and R. Hetland, "Non-geostrophic baroclinic instability in coastal buoyancy-driven flow," Ocean Sciences Meeting, San Diego, CA, February 16–21, 2020. (talk)

L. Qu , R. Hetland, and L. Thomas, "Submesoscale baroclinic instability over sloping bathymetry," Environmental Fluid Mechanics Laboratory Seminar, Stanford University, February 6, 2020. (talk)

L. Qu , and R. Hetland, "Sr: A number for baroclinic instability suppression," Gordon Research Conference: Coastal Ocean Dynamics, Southern New Hampshire University, June 17–21, 2019. (poster)

L. Qu , R. Hetland, and L. Thomas, "Mixing due to trapping of near-Inertial waves in a submesoscale eddy," Gordon Research Seminar: Coastal Ocean Dynamics, Southern New Hampshire University, June 15–16, 2019. (talk)

L. Qu , R. Hetland, and L. Thomas, "Internal-wave-driven mixing within submesoscale eddies," Oceanography Departmental Seminar, Texas A&M University, November 26, 2018. (talk)

L. Qu , R. Hetland, and L. Thomas, "Near-inertial waves at submesoscale coherent vortices in a buoyancy-driven flow," Physics of Estuaries and Coastal Seas Meeting 2018, Galveston, TX, October 14–19, 2018. (talk)

L. Qu and R. Hetland, "Baroclinic instabilities and near-inertial waves in buoyancy-driven flow," Communicating Ocean Science, Texas A&M University, May 7, 2018. (poster)

L. Qu and R. Hetland, "Non-geostrophic baroclinic instability over sloping bathymetry," AGU Virtual Poster, April, 2018. (poster)

L. Qu , R. Hetland*, and L. Thomas, "Effects of near-inertial wind forcing on baroclinic instabilities in a large buoyancy driven current," Ocean Sciences Meeting, Portland, OR, February 11–16, 2018. (talk)

L. Qu and R. Hetland, "Temporal resolution of wind forcing required for river plume prediction," Ocean Sciences Meeting, Portland, OR, February 11–16, 2018. (poster)

L. Qu , T. Zu, and R. Hetland, "An operational high-resolution ocean circulation forecast model on the Northern South China Sea shelf," Supercomputing 2017 Conference, Denver, CO, November 12–17, 2017. (poster)

L. Qu and R. Hetland, "Temporal resolution of wind forcing required for river plume predictions," Gordon Research Conference: Coastal Ocean Dynamics, University of New England, June 11–16, 2017. (poster)

L. Qu , T. Zu, and R. Hetland, "An operational high-resolution ocean circulation forecast model on the Northern South China Sea shelf," High Performance Research Computing: Research Computing Week, Texas A&M University, June 5–9, 2017. (poster)

T. Zu, J. Li, **L. Qu**, Y. Shu, J. Chen, H. Zhu, J. Yao, and D. Wang, "Variability of the coastal circulation revealed by High-Frequency Radar in the Guangzhou Bay of the northern South China Sea," AGU Fall Meeting, San Francisco, CA, December 12–16, 2016. (poster)

L. Qu, X. Lin, and R. Hetland, "The semienclosed oceanic response to wind bursts: the sub-inertial processes in the Yellow Sea and Bohai Sea," WCRP/CLIVAR Second International Symposium on Boundary Current Dynamics, Li Jiang, Yun Nan, China, July 8–9, 2013. (poster)

Funded Proposals

Lead Principal Investigator

L. Qu, China Scholarship Council Postgraduate Fellowship Program, August, 2014 – August, 2018, $76,800.0 total award.

Grants

"Effects of near-inertial oscillations on baroclinic instabilities in a large buoyancy driven current," Texas Sea Grant, June, 2018 – June, 2019, $1,687.5, PI: **L. Qu**.

Selected Other Conferences and Workshops Attended

SciPy Conference and Tutorial, Austin, TX, July, 2015, 2016, 2017, and 2018.

Special HPC Seminar and Workshop on Cloud Computing, Texas A&M University, March, 2017.

TUFTE Presenting Data and Information Workshop , Houston, TX, October, 2016.

COAWST Model Training, Woods Hole, MA, August, 2016.

NVIDIA GPU Programming Workshop, Texas A&M University, April, 2016.

Teaching

Teaching Assistant, Python for Geoscientists (OCNG 469/669), Texas A&M University, Spring 2017.

Teaching Assistant, Visual Basic Programming (Fundamental Series), Ocean University of China, Fall 2011.

Field Work

Northern Gulf of Mexico: R/V Point Sur, NSF RAPID, September, 2017.

Honors & Awards

James Sharp Graduate Scholarship, Texas A&M University, 2014 and 2018.

Chapman Award for Graduate Research, Texas A&M University, 2017.

Donald and Melba Ross Scholarship, Texas A&M University, 2017.

A.T. Webber ′22 and A.T. Webber, Jr. ′49 Fellowship in Oceanography, Texas A&M University, 2016.

Robert O. Reid Oceanography Fellowship, Texas A&M University, 2015.

Outstanding Graduate Student Award, Ocean University of China, 2012.

Excellent Undergraduate Student Award, Ocean University of China, 2011.

National Scholarship, Ministry of Education of China, 2009 and 2010.

First Prize Scholarship for Academic Performance, Ocean University of China, 2008, 2009, and 2010.

Service

Referee: Journal of Geophysical Research - Oceans; Continental Shelf Research; Ocean Science; Scientific Reports.

Judge for AGU Virtual Poster Showcase, 2018.

Meeting coordinator for Physics of Estuaries and Coastal Seas Meeting, Galveston, TX, 2018.

Meeting coordinator for Physical Oceanography Numerical Group, Texas A&M University, 2018–2019.

Professional Activities

Member: The Oceanography Society.

Skills

Idealized CFD Tools

Proficient in DIABLO (LES solver) and DEDALUS (PDE solver in spectral methods).

Ocean Modeling

Extensively used ROMS ocean modeling code; skilled in COAWST and GOTM modeling.

Programming Languages

Proficient in Python and Fortran; skilled in C, C++, and Matlab.

High Performance Computing

Skilled in MPI and OpenMP; experience with CUDA and OpenACC.

Other Skills

Proficient in Mathematica; skilled in LaTeX; extensive experience with LINUX/UNIX system administration, using a cluster, and shell scripting.