

个人简历



荆钊

教授、博士生导师

中国海洋大学/崂山实验室

出生年月：1987 年 7 月

研究方向：海洋中小尺度动力过程及其智能预报

教育经历

2006 年 9 月-2010 年 6 月，中国海洋大学，海洋科学，理学学士

2010 年 9 月-2012 年 6 月，中国海洋大学，物理海洋学，理学硕士

2012 年 9 月-2016 年 5 月，Texas A&M University，海洋学，博士

工作经历

2016 年 6 月-2017 年 6 月，Texas A&M University 海洋系，博士后

2017 年 7 月-至今，中国海洋大学物理海洋教育部重点实验室，教授

2022 年 8 月-至今，崂山实验室，教授

主持项目

- 崂山实验室，重大任务航次，南海*****观测试验航次，2025，947.74 万元，在研，主持
- 崂山实验室，科技创新项目，LSKJ202300300，基于国产新一代超算的海洋高分辨率多圈层耦合模拟预测系统研发及应用，2023-12 至 2026-12，23799.9844 万元，在研，主持
- 国家自然科学基金委员会，重大研究计划集成项目课题，92358303，西太平洋多圈层相互作用数据集成研究，2024-01 至 2026-12，300 万元，在研，主持
- 国家自然科学基金委员会，杰出青年科学基金项目，42325601，海洋中小尺度动力过程及其气候效应，2024-01-01 至 2028-12-31，400 万元，在研，主持
- 国家自然科学基金委员会，面上项目，42276006，全球变暖背景下赤道太平洋亚中尺度过程演变机理及其对海温变化的调控作用，2023-01-01 至 2026-12-31，54 万元，在研，主持

- 崂山实验室，科技创新项目，LSKJ202202500，海洋中小尺度动力过程对气候变化的响应和反馈，2022-10-01 至 2025-09-01，977.33 万元，在研，主持
- 国家自然科学基金委员会，优秀青年科学基金项目，41822601，海洋能量串级机理与混合参数化，2019-01-01 至 2021-12-31，130 万元，结题，主持
- 国家自然科学基金委员会，面上项目，41776006，海洋中尺度涡与近惯性内波之间能量交换的机理及其对深海大洋跨等密度面湍流混合的影响，2018-01-01 至 2021-12-31，71 万元，结题，主持
- 科技部重点研发计划课题，2018YF*****02，透明海洋*****系统，2018.12-2021.06，1494 万，结题，主持
- 国家***专项,南海*****调查航次,2019.01-2022.12,1999.88 万元，结题，主持

国内外学术兼职

CLIVAR 海洋模式发展工作组 委员

SWOT “Adopt-a-Crossover” Consortium 科学指导委员会 委员

个人荣誉

2019 年亚洲大洋洲地球科学协会 Kamide Lecture 奖

2019 年山东省青年泰山学者

2022 年山东省自然科学奖一等奖：太平洋西边界流 (7/10)

2016 年教育部自然科学奖一等奖：深海大洋能量传递的过程与机制及其对大气动力过程影响研究 (6/6)

主要研究成果

长期致力于海洋中小尺度过程与湍流混合领域的研究，取得了一系列创新性的成果，在 Nature、Nature Geoscience、Nature Climate Change、Science Advances、Journal of Physical Oceanography 等国际知名 SCI 期刊上发表论文 100 余篇。代表性成果有：系统阐释了风能驱动以及如何驱动深海大洋混合这一争论多年的关键科学问题，建立了全球风生混合参数化方案，成功再现了风生深海大洋混合的时空分布特征；在国际上率先利用新型 Argo Iridium 浮标的观测结果对南

大洋混合进行了研究,将目前国际上深海大洋混合研究从以间歇性局部的断面调查推向了持续性覆盖全球的观测研究的新时期;揭示了上层海洋涡旋垂向热输送与多尺度海气热交换间的耦合机理及其对热带气候系统变异的负反馈作用,拓展了多尺度海气相互作用理论;提出了全球大洋东边界中尺度上升流系统对气候变化的响应特征及其控制机理的新观点,为应对气候变化对大洋东边界上升流系统的影响提供了科学支撑;揭示了全球变暖会显著减弱海洋中尺度涡旋,进而导致海洋环流总动能不断减少,为海洋环流系统对气候变化的响应和反馈提供了新的认识;发展了全球高分辨率海洋环境智能预报大模型,预报性能优于国际顶尖机构发布的数值预报产品,达到国际领先水平;同时,与传统数值预报方法相比,在计算效率方面提升了3000倍,极大地节省了计算时间和能源消耗。

代表性文章列表

1. Hu X., J. Shi*, X. -H. Ma, Y. -J. Tang, **Z. Jing**, 2025: Oceanic feedback to the atmosphere for anomalous SST events speaking in early winter in the Northeast Pacific. *Geophysical Research Letters*, 52, e2025GL115562. <https://doi.org/10.1029/2025GL115562>.
2. Xu F., **Z. Jing***, H. Tian, 2025: Ekman pumping induced by geostrophic stress under nonlinear turbulent thermal wind balance. *Ocean Dynamics*, 75, 39. <https://doi.org/10.1007/s10236-025-01685-4>.
3. Xiao N. -Y., S. -P. Wang*, C. Yang, F. -F. Song, **Z. Jing**, L. -X. Wu, 2025: Weakened eddy activities in the South Pacific Subtropical Countercurrents under global warming. *Journal of Geophysical Research: Oceans*, 130, e2024JC022128. <https://doi.org/10.1029/2024JC022128>.
4. Cui Y. -Z.#, R. -H. Wu#, X. Zhang, Z. -Q. Zhu, B. Liu, J. Shi, J. -S. Chen, H. -L. Liu, S. -H. Zhou, L. Su, **Z. Jing***, H. An*, L. -X. Wu*, 2025: Forecasting the eddying ocean with a deep neural network. *Nature Communications*, 16, 2268. <https://doi.org/10.1038/s41467-025-57389-2>.
5. Yang H. -Y.#, H. -H. Guo#, Z. -H. Chen*, W. -J. Cai, L. -X. Wu, J. -Z. Cai, T. Geng, **Z. Jing**, B. -L. Gan, X. -H. Ma, Y. -Y. Wang, 2025: Onshore intensification of subtropical western boundary currents in a warming climate. *Nature Climate Change*, 15, 301–307. <https://doi.org/10.1038/s41558-025-02258-5>.

6. Li S. -J.*, L.-X. Wu, Y. -T. Wang, T. Geng, W. -J. Cai, B. -L. Gan, **Z. Jing**, Y. Yang, 2025: Intensified Atlantic multidecadal variability in a warming climate. *Nature Climate Change*, 15, 293–300, <https://doi.org/10.1038/s41558-025-02252-x>.
7. Duan J., Y. -L. Li*, Y. -L. Lyu, **Z. Jing**, F. Wang, Emergence of the North Pacific heat storage pattern delayed by decadal wind-driven redistribution. 2025: *Nature Communications*, 16, 668, <https://doi.org/10.1038/s41467-025-56005-7>.
8. Zhang X. -Y., P. -R. Yang*, **Z. Jing**, 2025: Modulation of Inverse Kinetic Energy Transfer by Eddy Current Feedback and Its Underlying Dynamics in the Kuroshio Extension. *Journal of Geophysical Research: Oceans*, 130 (2), e2024JC021823, <https://doi.org/10.1029/2024JC021823>.
9. Wang S. -P., **Z. Jing***, L. -X. Wu, S. -T. Sun, Z. -H. Chen, X. -H. Ma, B. -L. Gan, 2024: A more quiescent deep ocean under global warming. *Nature Climate Change*, 14: 961–967.
10. Yang Z. -B., **Z. Jing***, X. -M. Zhai, C. Vic, H. Sun, C. de Lavergne, and M. Yuan, 2024: Enhanced generation of internal tides under global warming. *Nature Communications*, 15, 7657.
11. Wang Z. -Q., **Z. Jing***, F. -F. Song, 2024: Weakened large-scale surface heat flux feedback at midlatitudes under global warming, *Nature Communications*, 15, 10020.
12. Zhang, X., F. -R. Li*, **Z. Jing***, B. -H. Zhang, X. -H. Ma, T.-S Du, 2024: Detecting marine heatwaves below the sea surface globally using dynamics-guided statistical learning. *Communications Earth & Environment*, 5, 616.
13. Yang P. -R., **Z. Jing***, H. -Y. Yang, and L. -X. Wu, 2024: A Scale-Aware Parameterization of Restratification Effect of Turbulent Thermal Wind Balance , *Journal of Physical Oceanography*, 54(5):1169–1181.
14. Sun B. -R., **Z. Jing***, M. Yuan, H. -Y. Yang, L. -X. Wu, 2024: Effects of horizontal resolution on long - range equatorward radiation of near - inertial internal waves in ocean general circulation models. *Journal of Advances in Modeling Earth Systems*, 16, e2024MS004216.
15. Bian C., **Z. Jing***, H. Wang and L. -X. Wu, 2024: Scale-Dependent Drivers of Marine Heatwaves Globally, *Geophysical Research Letters*, 51(3), e2023GL107306.
16. Du T. -S.*, **Z. Jing**, 2024: Fine-Scale Eddies Detected by SWOT in the Kuroshio Extension, *Remote Sensing*. 16(18), 3488, <https://doi.org/10.3390/rs16183488>.

17. Du T. -S., S. -P. Wang*, **Z. Jing** et al., 2024: Future changes in coastal upwelling and biological production in eastern boundary upwelling systems. *Nature Communications*, 15, 6238.
18. Yang H. -Y., Z. -H. Chen*, S. -T. Sun*, M. -K. Li, W. -J. Cai, L. -X. Wu, J. -Z. Cai, B. -R. Sun, K. Ma, **Z. Jing**, B. -L. Gan, 2024: Observations reveal intense air-sea exchanges oversubmesoscale ocean front. *Geophysical Research Letters*, 51, e2023GL106840, <https://doi.org/10.1029/2023GL106840>.
19. Yang H. -Y.*, J. -Z. Cai, L. -X. Wu, H. -H. Guo, Z. -H. Chen, **Z. Jing**, B. -L. Gan. 2024: The intensifying East China Sea Kuroshio and disappearing Ryukyu Current in a warming climate. *Geophysical Research Letters*, 51, e2023GL106944.
20. Li D. -P.*, **Z. Jing**, W. -J. Cai, Z. -G. Zhang, J.-X. Shi, X. -H. Ma, B. -L. Gan, H. -Y. Yang, Z. -H. Chen, L. -X. Wu, 2024: Mesoscale eddies inhibit intensification of the Subantarctic Front under global warming, *Environmental Research Letters*, 19, 114054.
21. Sun D.*, **Z. Jing** and H. -L. Liu, 2024: Deep learning improves sub-seasonal marine heatwave forecast. *Environmental Research Letters*, 19, 064035.
22. Ma X. -H., X. -Z. Zhang*, L. -X. Wu, Z. -L. Tang, P. -R. Yang, F. -F. Song, **Z. Jing**, H. Chen, Y. -S. Qu, M. Yuan, Z. -H. Chen, and B. -L. Gan, 2024: Midlatitude Mesoscale Thermal Air-sea Interaction Enhanced by Greenhouse Warming, *Nature Communications*, 15, 7699.
23. Guan S.-D. , F. -F. Jin*, J. -W. Tian*, I-I Lin*, Iam-Fei Pun, W. Zhao, John Huthnance, Z. Xu, W. -J. Cai, **Z. Jing** et al., 2024: Ocean internal tides suppress tropical cyclones in the South China Sea. *Nature Communications*, 15, 3903.
24. Zhang Z., M. Miao, B. Qiu, J. Tian, **Z. Jing**, G. Chen, Z. -H. Chen, W. Zhao*, 2024: Submesoscale eddies detected by SWOT and moored observations in the northwestern Pacific. *Geophysical Research Letters*, 51, e2024GL110000.
25. **Jing Z.**[#], S. -P. Wang[#], L. -X. Wu*, H. Wang, S. -H. Zhou, B. -R. Sun, Z. -H. Chen, X. -H. Ma, B. -L. Gan and H. -Y. Yang, 2023: Geostrophic Flows Control Future Changes of Oceanic Eastern Boundary Upwelling, *Nature Climate Change*, 13:148-154.
26. Bian C., **Z. Jing***, H. Wang, L. -X. Wu, Z. -H. Chen, B. -L. Gan and H. -Y. Yang, 2023: Oceanic Mesoscale Eddies as Crucial Drivers of Global Marine Heatwaves, *Nature Communications*, 14(1), 2970.

27. Wang S. -P., **Z. Jing***, L. -X. Wu, S. -T. Sun, Q. -H. Peng, H. Wang, Y. Zhang and J. Shi, 2023: Southern Hemisphere Eastern Boundary Upwelling Systems Emerging as Future Marine Heatwave Hotspots under Greenhouse Warming, *Nature Communications*, 14, 28.
28. Li Z. -R., **Z. Jing***, L. -X. Wu, R. Johnson, Z. -B. Yang, Z. Song, Z. -H. Chen, B. -L. Gan and X. -H. Ma, 2023: Enhanced Turbulent Diapycnal Mixing in the Northern Sargasso Sea Inferred from a Finescale Parameterization, *Journal of Geophysical Research: Oceans*, 128(12), e2023JC020220.
29. Zhang X. -Y., **Z. Jing*** and P. -R. Yang, 2023: Seasonality of upper-ocean vertical eddy buoyancy flux in the Kuroshio Extension. *Journal of Physical Oceanography*, 53(6): 1577-1590. <https://doi.org/10.1175/JPO-D-22-0173.1>.
30. Sun D., **Z. Jing***, F. -R. Li, L. -X. Wu, 2023: Characterizing global marine heatwaves under a spatio-temporal framework, *Progress in Oceanography*, 211, 102947.
31. Yang Z. -B., **Z. Jing*** and X. -M. Zhai, 2023: Greenhouse Warming Reduces Global Energy Conversion into Oceanic Lee Waves, *Geophysical Research Letters*, 50, e2023GL104467.
32. Yang Z. -B., **Z. Jing*** and X. -M. Zhai*, 2023: Energy Sinks for Lee Waves in the Northern South China Sea, *Journal of Geophysical Research: Oceans*, 128(1): ec2022JC019060.
33. Yang Z. -B., **Z. Jing*** and X. -M. Zhai, 2023: The Role of Small-Scale Topography in Modulating Eddy Scale in the Northern South China Sea, *Journal of Geophysical Research: Oceans*, 128(3).
34. Sun D., F. -R. Li*, **Z. Jing**, S. -J. Hu and B. -H. Zhang, 2023: Frequent Marine Heatwaves Hidden below the Surface of the Global Ocean, *Nature Geoscience*, 16(12), 1099-1104.
35. Wang S. -Y. , X. -H. Ma*, S. -H. Zhou, L. -X. Wu, H. Wang, Z. -L. Tang, G. -Z. Xu, **Z. Jing**, Z. -H. Chen, B. -L. Gan, 2023: Extreme atmospheric rivers in a warming climate. *Nature Communications*, 14, 3219, <https://doi.org/10.1038/s41467-023-38980-x>.
36. Gan B.-L.^{#*}, J. -J. Yu[#], L.-X. Wu, Gokhan Danabasoglu, R. Justin Small, Allison H. Baker, F. Jia, **Z. Jing**, X.-H. Ma, H.-H. Yang and Z.-H. Chen, 2023: North Atlantic subtropical mode water formation controlled by Gulf Stream fronts. *National Science Review*, 10(9), <https://doi.org/10.1093/nsr/nwad133>.
37. Du T. -S., S. -P. Wang*, **Z. Jing**, H. Wang and L. -X. Wu, 2023: Greenhouse warming Weakens the Seasonal Cycle of the Eastern Boundary Upwelling, *Geophysical Research Letters*, 50, e2023GL103857.

38. Hu X., J. Shi*, X. -H. Ma, R. -C. Ding, **Z. Jing** and Y. Zhang, 2023: Distinct Features of Mid-winter North Pacific Storm Track Suppression Associated with Central and Eastern Pacific El Niños. *Atmospheric Research*, 289, 106769.
39. Wang C. -C., S.- P. Wang*, **Z. Jing**, T. Geng, H. Wang and L.- X. Wu, 2023: Equatorial Submesoscale Eddies Contribute to the Asymmetry in ENSO Amplitude, *Geophysical Research Letters*, 50(5): e2022GL101352.
40. Zhu R. -C.[#], Y. -Q. Li[#], Z. -H. Chen*, T. -S. Du, Y. -Q. Zhang, Z. -R. Li, Z. -Y. Jing, H. -Y. Yang, **Z. Jing**, L. -X. Wu, 2023: Deep learning improves reconstruction of ocean vertical velocity. *Geophysical Research Letters*, 50, e2023GL104889. <https://doi.org/10.1029/2023GL104889>.
41. H.-H. Guo, Z. -H. Chen*, H. -Y. Yang, Y. Long, R. -C. Zhu, Y. -Q. Zhang, **Z. Jing**, C. Yang, 2023: Estimating the Volume Transport of Kuroshio Extension Based on Satellite Altimetry and Hydrographic Data, *Journal of Atmospheric and Oceanic Technology*, 40 (9), 1105-1118.
42. Y. -S. Qu, S. -P. Wang*, **Z. Jing**, Y. Zhang, H. Wang, L. -X. Wu, 2023: Tropical Pacific Quasi-Decadal Variability Suppressed by Submesoscale Eddies, *Journal of Climate*, 36(22), 7847–7863.
43. Geng, T., F. Jia*, W. -J. Cai*, L. -X. Wu, B. -L. Gan, **Z. Jing**, S. -J. Li, 2023: Increased occurrences of consecutive La Niña events under global warming. *Nature*, 619, 774–781, <https://doi.org/10.1038/s41586-023-06236-9>.
44. Wang S. -P., **Z. Jing***, L. -X. Wu, W. -J. Cai, P. Chang, H. Wang, T. Geng, G. Danabasoglu, Z. -H. Chen, X. -H. Ma, B. -L. Gan and H. -Y. Yang, 2022: El Niño/Southern Oscillation inhibited by submesoscale ocean eddies, *Nature Geoscience*, 15(2):112-117.
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46. Wang S. -P., **Z. Jing***, L. -X. Wu, W. -J. Cai, T. Geng, P. Chang, G. Danabasoglu, H. Wang, C. C. Wang, Z. -H. Chen, X. -H. Ma, B. -L. Gan and H. -Y. Yang, 2022: Weakened Submesoscale Eddies in the Equatorial Pacific Under Greenhouse Warming, *Geophysical Research Letters*, 49(21): e2022GL100533.
47. Yang Z. -B., **Z. Jing*** and X. -M. Zhai*, 2022: Effect of Small-Scale Topography on Eddy Dissipation in the Northern South China Sea, *Journal of Physical Oceanography*,

52(10):2397-2416.

48. Xu F., **Z. Jing***, P. -R. Yang and S. -H. Zhou, 2022: Vertical Motions Driven by Geostrophic Stress in Surface Boundary Layer Under a Finite Ekman Number Regime, *Journal of Physical Oceanography*, 52(12):3033-3047.
49. Yang P. -R., **Z. Jing***, H. Wang, L. -X. Wu, Y. -H. Chen and S. -H. Zhou, 2022: Role of Frictional Processes in Mesoscale Eddy Available Potential Energy Budget in the Global Ocean, *Geophysical Research Letters*, 49(13): e2021GL097557.
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51. Wang S. -P., **Z. Jing***, L. -X. Wu, H. Wang, J. Shi, Z. -H. Chen, X. -H. Ma, B. -L. Gan, H. -Y. Yang and X. Liu, 2022: Changing ocean seasonal cycle escalates destructive marine heatwaves in a warming climate, *Environmental Research Letters*, 17(5):054024.
52. Yuan M., Z. Song*, **Z. Jing**, Z. -R. Li and L. -X. Wu, 2022: Distinct roles of global cyclonic and anticyclonic eddies in regulating near-inertial internal waves in the ocean interior, *Frontiers in Marine Science*, 9:949610.
53. Li Q., Z. -H. Chen*, S. Guan, H. -Y. Yang, **Z. Jing**, Y. -Z. Liu, B. -R. Sun and L. -X. Wu, 2022: Enhanced Near-Inertial Waves and Turbulent Diapycnal Mixing Observed in a Cold- and Warm-Core Eddy in the Kuroshio Extension Region, *Journal of Physical Oceanography*, 52(8):1849-1866.
54. Geng T., W. -J. Cai*, L. -X. Wu*, A. Santoso, G. -J. Wang, **Z. Jing**, B. -L. Gan, Y. Yang, S. -J. Li, S. -P. Wang, Z. -H. Chen and M. J. McPhaden, 2022: Emergence of changing Central-Pacific and Eastern-Pacific El Niño-Southern Oscillation in a warming climate, *Nature Communications*, 13(1):6616.
55. Xu, G. -P.*, P. Chang, S. Ramachandran,, G. Danabasoglu,, S. Yeager, J. Small, Q. -Y. Zhang , **Z. Jing**, L. -X. Wu., 2022: Impacts of model horizontal resolution on mean sea surface temperature biases in the Community Earth System Model. *Journal of Geophysical Research: Oceans*, 127, e2022JC019065.
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