

# Academician WU Lixin

## Chair Professor in Physical Oceanography, Ocean University of China



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### Personal Information

- Date of Birth: September 17, 1966
- Place of Birth: Anhui, China
- Nationality: Chinese

### Research Interests

- Modeling global climate system
- Large-scale ocean-atmosphere interaction
- Decadal climate variability
- Climate variability and change in the past, present and future
- Modeling and dynamics of general oceanic circulation
- Dynamics of geophysical fluid

### Education and Employment

- 1983-1988 B.Sc in Mechanical Engineering, Tsinghua University, China
- 1988-1991 M.Sc in Department of Mechanics, Peking University, China
- 1991-1994 PhD in Department of Mechanics, Peking University, China
- 1994-1995 Postdoctoral Associate, Laboratory for Visualization and Reduced Modeling, Rutgers University, NJ, USA
- 1995-2005 Research Scientist, University of Wisconsin-Madison, USA
- 2005- Chair Professor, Key Laboratory of Physical Oceanography, MOE, Ocean University of China, China
- 2010- Director, Key Laboratory of Physical Oceanography, MOE, Ocean University of China, China
- 2013- Member, Chinese Academy of Sciences (CAS), China

### Awards

- 2007 Recipient, National Funds for Distinguished Young Scientists of China
- 2009 Leader of Innovative Research Group, National Natural Science Foundation of China
- 2010 Distinguished Professor, Taishan Scholars Program, Shandong Province
- 2011 Distinguished Professor, Chang Jiang Scholars Program, Ministry of Education, China
- 2012 Outstanding Supervisor for PhD/Master Candidates, Shandong Province
- 2013 Leader of Key Innovation Research Group, Ministry of Science and Technology, China

## Committees

### International

- 2010- Member, CLIVAR NPOCE Scientific Steering Committee
- 2011- Member, CLIVAR Pacific Panel
- 2011- Member, PICES Working Group 27: North Pacific Climate Variability and Change
- 2012- Member, CLIVAR Scientific Steering Group

### China

- 2011- Member of Editorial Board, *Chinese Journal of Oceanography and Limnology*
- 2013- Member of Editorial Board, *Scientia Sinica Terrae*

### Germany

- 2012- Member, Advisory Board, Cluster of Excellence "Future Ocean", Germany

## Projects

### NSFC Projects (financed by National Natural Science Foundation of China)

- 2006-2008 Role of North Pacific Ocean Circulation adjustment in decadal climate change, 390k *Yuan* RMB
- 2008-2011 Physical oceanography, 2 mil *Yuan* RMB
- 2009-2012 Key process of low-altitude west boundary currents in low-frequency variability of warm pool, 1.2 mil *Yuan* RMB
- 2010-2012 Evolution mechanisms of ocean dynamic process and its role in climate change, 6 million *Yuan* RMB
- 2010-2012 Boundary dynamics: Connection with open ocean and coastal seas, Climate Impacts, 50k *Yuan* RMB
- 2012-2016 Mechanisms and predictability of Pacific Decadal Oscillation, 3.1 mil *Yuan* RMB
- 2013-2015 Evolution mechanisms of ocean dynamic process and its role in climate change (Phase II), 6 mil *Yuan* RMB

### MOST Projects (financed by Ministry of Science and Technology, China)

- 2007-2011 Variability of Subtropical North Pacific Ocean Circulation and its impacts on dynamic environment of China Marginal Seas, 32 mil *Yuan* RMB
- 2013-2017 Processes and mechanisms of multi-scale marine variability in the Northwest Pacific and its predictability, 26 mil *Yuan* RMB

### Project financed by Shandong Province, China

- 2008-2010 Impacts of ocean circulation on decadal climate change, 500k *Yuan* RMB

## Publications

Number of Items: 76

1. Wang, C., L. Zhang, S. LEE, L. Wu, and C. Mechoso, 2013: A Global Perspective on CMIP5 Climate Model Biases, *Nature Climate Change*, in press.
2. Cai, W., S. Borlace, M. Lengaigne, P. Rensch, M. Collins, G. Vecchi, A. Timmermann, A. Santoso, M. McPhaden, L. Wu, M. England, G. Wang, E. Guilyardi, and F. Jin, 2013: Increasing frequency of extreme El Niño events due to greenhouse warming. *Nature Climate Change*, in press.

3. Chen, Z., L. Wu, B. Qiu, S. Sun, and F. Jia, 2013: Seasonal Variation of the South Equatorial Current Bifurcation off Madagascar, *Journal of Physical Oceanography*, in press.
4. Gan, B., and L. Wu, 2013: Centennial trends in Northern Hemisphere winter storm tracks over the twentieth century. *Quarterly Journal of the Royal Meteorological Society*. doi:10.1002/qj.2263, in press.
5. Fang, C., L. Wu, and X. Zhang, 2013, The impact of global warming on the pacific decadal oscillation and the possible mechanism. *Advances in Atmospheric Sciences*, in press.
6. Jing, Z., and L. Wu, 2013: Low-frequency variability of turbulent diapycnal mixing revealed by HOT time series, *Journal of Physical Oceanography*, **43**,824-835.
7. Sun, S., L. Wu, and B. Qiu, 2013: Response of the Inertial Recirculation to intensified stratification in a 2-layer Quasi-Geostrophic ocean circulation model. *Journal of Physical Oceanography*, **43**, 1254-1269.
8. Wu, L., Z. Chen, 2013: Advances and challenges in physical oceanography observation, *Advances in Earth Science*, **28**(5), 542-551. (in Chinese)
9. Badin, G., R. Williams, Z. Jing, and L. Wu, 2013: Water-mass transformations in the Southern Ocean diagnosed from observations: contrasting effects of air-sea fluxes and diapycnal mixing. *Journal of Physical Oceanography*, **43**, 1472–1484.
10. Hu, D., S. Hu, L. Wu, L. Lei, L. Zhang, X. Diao, Z. Chen, Y. Li, F. Wang and D. Yuan, 2013: Direct measurements of the Luzon Undercurrent. *Journal of Physical Oceanography*, **43**, 1417–1425.
11. Jia, F., and L. Wu, 2013: A study of equatorial Pacific SST to doubled-CO<sub>2</sub> forcing in the coupled CAM-1.5 layer reduced-gravity ocean model. *Journal of Physical Oceanography*, **43**, 1288–1300.
12. Zhang, L., L. Wu, and B. Gan, 2013: Modes and mechanisms of global water vapor over the 20th century. *Journal of Climate*, **26**, 5578–5593.
13. Gan, B., and L. Wu, 2013: Seasonal and long-term coupling between wintertime storm tracks and sea surface temperature in the North Pacific. *Journal of Climate*, **43**, 1254-1269.
14. Liang, X., and L. Wu, 2013: Effects of Solar Penetration on the Annual Cycle of SST in the North Pacific. *Journal of Geophysical Research*, **118**, 2793-2801.
15. Li, C., and L. Wu, 2013: Dynamic linkage between the North Pacific and the Tropical Pacific: Atmosphere–ocean coupling. *Advances in Atmospheric Sciences*, **30**(2), 306-314.
16. Ma, H., L. Wu, and Li, Z, 2013: Impact of freshening over the Southern Ocean on ENSO. *Atmospheric Science Letters*, **14**(1), 28-33.
17. Li, C., L. Wu, S.-P. Xie, 2013: Impacts of Interhemispheric Asymmetric Thermal Forcing on Tropical Pacific Climate: Surface Air–Sea Coupling and Subduction. *Journal of Climate*, **26** (2), 575-582.
18. Chen, Z., and L. Wu, 2012: Long-term change of the Pacific North Equatorial Current bifurcation in SODA. *Journal of Geophysical Research*, **117** (C6), C06016.
19. Gan, B. and L. Wu, 2012: Modulation of Atmospheric Response to North Pacific SST Anomalies under Global Warming. *Journal of Climate*, **25** (19), 6554-6566.
20. Gan, B., and L. Wu, 2012: Possible Origins of the Western Pacific warm pool decadal variability. *Advances in Atmospheric Sciences*, **29** (1), 169-176.
21. Liu, C., and L. Wu, 2012: An intensification trend of South Pacific Mode Water subduction rates over the 20<sup>th</sup> century. *Journal of Geophysical Research*, **117** (C7), C07009.
22. Wu, L., W. Cai, L. Zhang, H. Nakamura, A. Timmermann, T. Joyce, M.J. McPhaden, M. Alexander, B. Qiu, M. Visbeck, and P. Chang, 2012: Enhanced warming over the global subtropical western boundary currents. *Nature Climate Change*, **2**, 161-166.
23. Yang, H., and L. Wu, 2012: Trends of upper-layer circulation in the South China Sea during 1959–2008. *Journal of Geophysical Research*, **117** (C8), C08037.
24. Yang, Y., L. Wu, and C. Fang, 2012: Will Global Warming Suppress North Atlantic Tripole Decadal Variability? *Journal of Climate*, **25** (6), 2040-2055.

25. Zhang, L. and L. Wu, 2012: Can Oceanic Freshwater Flux Amplify Global Warming? *Journal of Climate*, **25** (9), 3417-3430.
26. Zhang, L., C. Wang and L. Wu, 2012: Low-Frequency Modulation of the Atlantic Warm Pool by the Atlantic Multidecadal Oscillation. *Climate Dynamics*, **39** (7-8), 1661-1671.
27. Chen, Z., and L. Wu, 2011: Dynamics of the seasonal variation of the North Equatorial Current bifurcation. *Journal of Geophysical Research*, **116** (C2), C02018.
28. Jia, F., L. Wu, and B. Qiu, 2011: Seasonal Modulation of Eddy Kinetic Energy and Its Formation Mechanism in the Southeast Indian Ocean, *Journal of Physical Oceanography*, **41** (4), 657-665.
29. Jia, F., L. Wu, J. Lan and B. Qiu, 2011: Interannual modulation of eddy kinetic energy in the southeast Indian Ocean by Southern Annular Mode. *Journal of Geophysical Research*, **116** (C2), C02029.
30. Jing, Z., L. Wu, L. Li, C. Liu, X. Liang, Z. Chen, D. Hu, and Q. Liu, 2011: Turbulent diapycnal mixing in the subtropical northwestern Pacific: Spatial-seasonal variations and role of eddies. *Journal of Geophysical Research*, **116** (C10), C10028.
31. Li, C., L. Wu, and P. Chang, 2011: A Far-Reaching Footprint of the Tropical Pacific Meridional Mode on the Summer Rainfall over the Yellow River Loop Valley. *Journal of Climate*, **24** (10), 2585-2598.
32. Ma, H., and L. Wu, 2011: Global Teleconnections in Response to Freshening over the Antarctic Ocean. *Journal of Climate*, **24** (4), 1071-1088.
33. Wu, L., Z. Jing, S. Riser and M. Visbeck, 2011: Seasonal and spatial variations of Southern Ocean diapycnal mixing from Argo profiling floats. *Nature Geoscience*, **4**, 363-366.
34. Zhang, L., L. Wu, and J. Zhang, 2011: Coupled Ocean-Atmosphere Responses to Recent Freshwater Flux Changes over the Kuroshio-Oyashio Extension Region. *Journal of Climate*, **24** (5), 1507-1524.
35. Zhang, L., L. Wu, and J. Zhang, 2011: Simulated Response to Recent Freshwater Flux Change over the Gulf Stream and Its Extension: Coupled Ocean-Atmosphere Adjustment and Atlantic-Pacific Teleconnection. *Journal of Climate*, **24**(15), 3971-3988.
36. Zhang, L., L. Wu, and L. Yu, 2011: Oceanic Origin of A Recent La Nina-Like Trend in the Tropical Pacific. *Advances in Atmospheric Sciences*, **28** (5), 1-9.
37. Jing, Z., and L. Wu, 2010: Seasonal variation of turbulent diapycnal mixing in the northwestern Pacific stirred by wind stress. *Geophysical Research Letter*, **37** (23), L23604.
38. Ma, H., L. Wu, and C. Li, 2010: The roles of southern high latitude wind stress in global climate. *Advances in Atmospheric Sciences*, **27** (2), 371-381.
39. Wu, L., Y. Sun, J. Zhang, L. Zhang, and S. Minobe, 2010: Coupled Ocean-Atmosphere Response to Idealized Freshwater Forcing over the Western Tropical Pacific. *Journal of Climate*, **23** (7), 1945-1954.
40. Wu, S., L. Wu, Q. Liu, and S.-P. Xie, 2010: Development processes of the tropical Pacific meridional mode. *Advances in Atmospheric Sciences*, **27** (1), 95-99.
41. Zhang, L., L. Wu, X. Lin, and D. Wu, 2010: Modes and mechanisms of sea surface temperature low-frequency variations over the coastal China seas. *Journal of Geophysical Research*, **115** (C8), C08031.
42. Zhang, H., and L. Wu, 2010: Predicting North Atlantic sea surface temperature variability on the basis of the first-mode baroclinic Rossby wave model. *Journal of Geophysical Research*, **115** (C9), C09030.
43. Li, C., L. Wu, L. Qu, Q. Wang and L. Zhang, 2009: An intimate coupling of ocean-atmospheric interaction over the extratropical North Atlantic and Pacific. *Climate Dynamics*, **32** (6), 753-765.
44. Yang, J., Q. Liu, Z. Liu, L. Wu, and F. Huang, 2009: Basin mode of Indian Ocean sea surface temperature and northern hemisphere circumglobal teleconnection. *Geophysical Research Letter*, **36** (19), L19705.
45. Fang, C. and L. Wu, 2008: The role of ocean dynamics in tropical Pacific SST response to warm climate in a fully coupled GCM. *Geophysical Research Letter*, **35** (8), L08703.
46. Wu, L., C. Li, C. Yang, and S.-P. Xie, 2008: Global teleconnections in response to a shutdown of the Atlantic meridional overturning circulation, *Journal of Climate*, **21** (12), 3002-3019.

47. Liu, Z., Y. Liu, L. Wu and R. Jacob, 2007: Seasonal and long-term atmospheric responses to reemerging North Pacific ocean variability: A combined dynamical and statistical assessment. *Journal of Climate*, **20** (6), 955-980.
48. Wu, L., F. He, Z. Liu and C. Li, 2007: Atmospheric teleconnections of tropical Atlantic variability: Interhemispheric, tropical-extratropical, and cross-basin interactions. *Journal of Climate*, **20** (5), 856-870.
49. Wu, L., and C. Li, 2007: Warming of the North Pacific Ocean: Local air-sea coupling and remote climatic impacts, *Journal of Climate*, **20** (11), 2581-2601.
50. Wu, L., Z. Liu, C. Li and Y. Sun, 2007: Extratropical control of recent tropical Pacific decadal climate variability: A relay teleconnection. *Climate Dynamics*, **28** (1), 99-112.
51. Wu, L., Q. Liu, D. Hu, C. Li, J. Zuo, Y. Yu, C. Sun and Q. Wang, 2007: Variability of Subtropical North Pacific Ocean Circulation and its impacts on dynamic environment of China Marginal Seas, *Advances in Earth Sciences*, **22**(12), 1224-1230. (in Chinese)
52. Yang, J., Q. Liu, S.-P. Xie, Z. Liu and L. Wu, 2007: Impact of the Indian Ocean SST basin mode on the Asian summer monsoon. *Geophysical Research Letter*, **34** (2), L02708.
53. Wu, L., D. Lee, and Z. Liu, 2005: The 1976/77 North Pacific climate regime shift: The role of subtropical ocean adjustment and coupled ocean-atmosphere feedbacks. *Journal of Climate*, **18** (23), 5125-5140.
54. Wu, L., and Z. Liu, 2005: North Atlantic Decadal Variability: Air-Sea Coupling, Oceanic Memory, and Potential Northern Hemisphere Resonance. *Journal of Climate*, **18** (2), 331-349.
55. Wu, L., F. He, and Z. Liu, 2005: Coupled ocean-atmosphere response to north tropical Atlantic SST: Tropical Atlantic Dipole and ENSO. *Geophysical Research Letter*, **32** (21), L21712.
56. Wu, L., Z. Liu, Y. Liu, Q. Liu and X. Liu, 2005: Potential global climatic impacts of the North Pacific Ocean, *Geophysical Research Letter*, **32** (24), L24710.
57. Liu, Z., and L. Wu, 2004: Atmospheric Response to North Pacific SST: The Role of Ocean-Atmosphere Coupling. *Journal of Climate*, **17** (9), 1859-1882.
58. Wu, L., Q. Zhang, and Z. Liu, 2004: Toward understanding tropical Atlantic variability using coupled modeling surgery, in Earth's Climate: The Ocean-Atmosphere Interaction, *Geophys. Monogr. Ser.*, vol. **147**, edited by C. Wang, S.-P. Xie, and J. A. Carton, pp. 157-170, AGU, Washington, D. C.
59. Liu, Z., Q. Zhang, and L. Wu, 2004: Remote impact on tropical Atlantic climate variability: Statistical assessment and dynamic assessment. *Journal of Climate*, **17** (7), 1529-1549.
60. Wang, D., J. Wang, L. Wu and Z. Liu, 2003: Relative importance of wind and buoyancy forcing for interdecadal regime shifts in the Pacific. *Science in China*, **46** (5), 417-427.
61. Wang, D., J. Wang, L. Wu, and Z. Liu, 2003: Regime shifts in the North Pacific simulated by a COADS-driven isopycnal model. *Advances in Atmospheric Sciences*, **20** (5), 743-754.
62. Wu, L., Z. Liu, R. Gallimore, R. Jacob, D. Lee, and Y. Zhong, 2003: Pacific decadal variability: the Tropical Pacific Mode and the North Pacific Mode. *Journal of Climate*, **16** (8), 1101-1120.
63. Wu, L., and Z. Liu, 2003: Decadal Variability in the North Pacific: the Eastern North Pacific Mode. *Journal of Climate*, **16** (19), 3111-3131.
64. Wu, L., and Z. Liu, 2003: On the dynamics of North Atlantic decadal variability, *Clivar Exchange*, **28**.
65. Liu, Z., L. Wu, R. Gallimore, and R. Jacob, 2002: Search for the origins of Pacific decadal climate variability. *Geophysical Research Letter*, **29** (10), 1404.
66. Wu, L., and Z. Liu, 2002: Is tropical Atlantic variability driven by the North Atlantic Oscillation? *Geophysical Research Letter*, **29** (13), 1653.
67. Wu, L., and Z. Liu, 2002: Dynamical control of Pacific low-frequency oceanic variability on the western boundary and marginal seas. *Geophysical and Astrophysical Fluid Dynamics*, **96** (3), 201-222.
68. Wu, L., Q. Zhang, and Z. Liu, 2002: Searching for the role of ENSO in the tropical Atlantic variability. *Clivar Exchanges*, **25** (7).
69. Wu, L., Z. Liu and R. Gallimore, 2001: Pacific interdecadal variability in a coupled model. *Dynamics of Atmospheric and Oceanic*

*Circulations and Climate*, ed. B. Wang, China Meteorological Press, 486-507, Beijing.

70. Liu, Z., J. Kutzbach, and L. Wu, 2000: Modeling climatic shift of El Nino in the Holocene, *Geophysical Research Letter*, **27** (15), 2265-2268.
71. Wu, L., and Z. Liu, 2000: Kelvin wave and Rossby wave interaction in the extratropical-tropical Pacific. *Geophysical Research Letter*, **27** (9), 1259-1262.
72. Liu, Z., and L. Wu, 2000: Tropical Atlantic variability in a coupled GCM. *Atmospheric Science Letters*, **1**(1), 26-36. doi: 10.1006/asle.2000.0003.
73. Liu, Z., L. Wu, and E. Bayler, 1999: Rossby wave-coastal Kelvin wave interaction in the extratropics. Part I: Low-frequency adjustment in a closed basin. *Journal of Physical Oceanography*, **29** (9), 2382-2404.
74. Liu, Z., L. Wu, and H. Hurlburt, 1999: Rossby wave-coastal Kelvin wave interaction in the extratropics. Part II: formation of island circulation. *Journal of Physical Oceanography*, **29** (9), 2405-2418.
75. Wu, L., Z. Liu, and H. Hurlburt, 1999: The effect of continental slope on buoyancy-driven circulation. *Journal of Physical Oceanography*, **29** (8), 1881-1891.
76. Wu, L., Z. Liu, and H. Hurlburt, 1999: The effect of north-south gyre width on the inertial recirculation. *Geophysical and Astrophysical Fluid Dynamics*, **91** (1), 45-63.