

Curriculum Vitae

Dr. Xuebin Zhang

Education

Ph. D., Physical Oceanography, 2008, University of Washington, Seattle, USA

Professional Experience

- **Principal Research Scientist** (CSOF7) (07/2019-current), CSIRO Oceans and Atmosphere / CSIRO Environment, Australia
- **Senior Research Scientist** (CSOF6) (07/2014-06/2019), CSIRO Oceans and Atmosphere, Australia
- **Research Scientist** (CSOF5) (08/2010-06/2014), CSIRO Marine and Atmospheric Research, Australia
- **Postdoctoral Scholar** (10/2008-08/2010), Scripps Institution of Oceanography, University of California, San Diego, USA
- **Postdoctoral Research Associate** (01/2008-10/2008), Joint Institute for the Study of the Atmosphere and Ocean (JISAO), University of Washington & NOAA/Pacific Marine Environmental Laboratory, USA

Research Expertise: Sea-level rise, ocean dynamics, climate change and variability, ocean and climate modelling, dynamical downscaling, adjoint modelling, large-scale ocean circulation, air-sea interaction

Academic Supervision:

Supervised 3 postdoctoral fellows, 7 PhD students, 4 Honours students since 2010

Project/Team Leadership & Research Grants (selected)

- **Research Team Leader** – Sea level, Waves and Remote Sensing (SLWRS) Team, CSIRO (2021-2024)
- **Acting Research Group Leader** - High-Resolution Climate, Ocean & Extremes Research Group, CSIRO (12/2023; 9-10/2024)
- CSIRO CERC postdoctoral Fellowship – Producing reliable regional sea-level projections ready for adaptation planning (AUD \$910K, 2024-2027)
- Australia National Environmental Science Program (NESP) Climate Systems Hub – Oceans and Coasts Project (AUD \$3,142K, 2022-2024)
- Centre for Southern Hemisphere Ocean Research (CSHOR) - The role of the Southern Ocean in sea level change (AUD \$2,750K, 2017-2022)
- CSIRO – Ocean Downscaling Strategic Project (AUD \$650K, 2014-2016)
- CSIRO OCE Postdoctoral Fellowship - Detection and attribution of sea level change (AUD \$812K, 2013-2016)
- Pacific-Australia Climate Change Science Adaptation Planning (PACCSAP) Program - Sea level understanding and projections for the Pacific Islands region (AUD \$932K, 2011-2013)

Professional Service (since 2016)

- Co-Chair for Session – OS01 “Understanding multiscale sea-level change using observations and models: global to local” at 2025 AOGS conference, Singapore.
- Member of Joint Taskforce on Regional Ocean Modelling and Climate Projections by WCRP CLIVAR – OMDP (Ocean Model Development Panel) and RfS – CORDEX (Regional Information for Society/ Coordinated Regional Climate Downscaling Experiment) (2024 - 2026)
- Member of CLIVAR Working Group on Tropical Pacific Decadal Variability (2021-2022)

- Member of CLIVAR Pacific Regional Panel (2017-2021)
- Co-Chair for Session – OS04 “Understanding multiscale sea-level change using observations and models: global to local” at 2023 AOGS conference, Singapore.
- Co-Chair for Session – OS15 “Understanding Sea Level Change: Global to Local, from Past to Future” at 2021 AOGS conference (virtual)
- Convening Co-Chair for Session OS11 “Sea Level Rise: Understanding, Observing and Modelling” and Co-Chair for Session AS07 “Indo-Pacific Climate Variability and Its Teleconnection to Southern Hemisphere” at 2020 AOGS conference, Hongcheon, Korea (cancelled due to COVID)
- Co-Chair for Sessions – “Southern Hemisphere oceans variability and change” and “Ocean extremes and their impacts” at 2020 AMOS conference, Perth, Australia
- Convening Co-Chair for Session 2 – “Dynamics of the Southern Hemisphere oceans” at 2019 AMOS-ICTMO 2019 conference, Darwin, Australia
- Convening Co-Chair for Session OS14 – “Progress in Ocean Heat Uptake and Sea Level Studies” at 2018 AOGS annual conference, Honolulu, USA
- Convening Co-Chair for Session 1.4 – “Collaborative Research under the Centre for Southern Hemisphere Ocean Research (CSHOR)” at AMOS-ICSHMO 2018 conference, Sydney, Australia
- Convening Co-Chair for Session OS12 – “Progress In Ocean Heat Uptake and Sea Level Studies” at 2016 AOGS annual conference, Beijing, China

Publication (Google Scholar: Citations 5,023, h-index 35)

Selected Journal Articles (*full list can be found in Google Scholar*)

(♦PhD student or postdoc under my supervision; † corresponding author)

1. ♦Huang, R., †**X. Zhang**, J. A. Church and †J. Hu, 2025: Asymmetric changes of the subtropical gyre circulation and associated sea level over 1960–2018 in the Pacific Ocean, *Journal of Geophysical Research: Oceans*, accepted.
2. Sun, C. and co-authors: 2024: Climate refugia in the Great Barrier Reef may endure into the future, **Science Advances**, 10, eado6884 (2024), doi: 10.1126/sciadv.ado6884.
3. ♦†Zhang, J., †**X. Zhang**, M. A. King and K. Lyu, 2024: A model-based investigation of the recent rebound of shelf water salinity in the Ross Sea, *Geophysical Research Letters*, 51 (18), e2023GL106697.
4. ♦Wang J., †J. A. Church and †**X. Zhang** and X. Chen, 2024: Improved sea-level reconstruction from 1900 to 2019. *Journal of Climate*, in press.
5. Matt, K., K. Lyu and **X. Zhang**, 2023: Climate variability a key driver of recent Antarctic ice-mass change, **Nature Geoscience**, 16, 1128–1135.
6. Capotondi, A., McGregor, S., McPhaden, M.J. et al. 2023: Mechanisms of tropical Pacific decadal variability, **Nature Reviews Earth & Environment**, 4, 754–769.
7. Boschetti, F., M. Feng, J. R. Hartog, A. J. Hobday and **X. Zhang**, 2023: Sea surface temperature predictability assessment with an ensemble machine learning method using climate model simulations, *Deep Sea Research II* 210 (2023) 105308.
8. Cai, W., L. Gao, Y. Luo, X. Li, X. Zheng, **X. Zhang**, X. Cheng, F. Jia, A. Purich, A. Santoso, et al. 2023: Southern Ocean warming and its climatic impacts, *Science Bulletin*, 68 (9), 946-960.
9. ♦†Lyu, K., †**X. Zhang**, J. A. Church, Q. Wu, R. Fiedler and F. Boeira Dias, 2022: Roles of Surface Forcing in the Southern Ocean Temperature and Salinity Changes under Increasing CO₂: Perspectives from Model Perturbation Experiments and a Theoretical Framework, *Journal of Physical Oceanography*, 53, 19-36.
10. Liu, W., M. I. Hegglin, R. Checa-Garcia, S. Li, N. P. Gillett, K. Lyu, **X. Zhang** and N. C. Swart, 2022: Stratospheric ozone depletion and tropospheric ozone increases drive Southern Ocean interior warming, **Nature Climate Change**, 12, 365-372.

11. ♦Lyu, K., **X. Zhang**, J. A. Church, 2021: Projected ocean warming constrained by the ocean observational record, **Nature Climate Change**, 11, 834-839.
12. Mortenson, E., A Lenton, E. H. Shadwick, T. W. Trull, M. A. Chamberlain and **X. Zhang**, 2021: Divergent trajectories of ocean warming and acidification, *Environmental Research Letter*, 16 (12), 124063.
13. ♦Jin, Y., †**X. Zhang**, J. A. Church, and X. Bao, 2021: Projected sea level changes in the marginal seas near China based on dynamical downscaling, *Journal of Climate*, 34, 7037-7055.
14. ♦Wang, J., †J. A. Church, †**X. Zhang**, J. M. Gregory, L. Zanna and X. Chen, 2021: Evaluation of the local sea-level budget at tide gauges since 1958, *Geophysical Research Letters*, 48, e2021GL094502.
15. Power, S. and co-authors, 2021: Decadal climate variability in the tropical Pacific: Characteristics, causes, predictability, and prospects, **Science**, 374, eaay9165, doi:10.1126/science.aay9165.
16. Li, S., W. Liu, K. Lyu and **X. Zhang**, 2021: The effects of historical ozone changes on Southern Ocean heat uptake and storage, *Climate Dynamics*, 57 (7), 2269-2285
17. ♦Wu, Q., †**X. Zhang**, J. A. Church, J. Hu, and J. M. Gregory, 2021: Evolving patterns of sterodynamical sea-level rise under mitigation scenarios and insights from linear system theory, *Climate Dynamics*, 57, 635-656.
18. ♦Wang, J., †J. A. Church, †**X. Zhang**, and X. Chen, 2021: Reconciling global mean and regional sea level change in projections and observations, **Nature Communications**, 12, 990.
19. ♦Lyu, K., †**X. Zhang** and J. A. Church, 2020: Regional dynamical sea level simulated in the CMIP5 and CMIP6 models: mean biases, future projections and their linkages, *Journal of Climate*, 33, 6377-6398.
20. Grose, M., S. Narsey, F. Delage, A. Dowdy, M. Bador, G. Boschat, C. Chung, J. Kajtar, S. Rauniyar, M. Freund, K. Lyu, H. Rashid, **X. Zhang**, S. Wales, C. Trenham, N. Holbrook, T. Cowan, L. Alexander, J. Arblaster and S. Power (2020). Insights from CMIP6 for Australia's future climate, *Earth's Future*, 8, e2019EF001469. doi.org/10.1029/2019EF001469.
21. ♦Lyu, K., †**Zhang, X.**, Church, J. A., & Wu, Q., 2020: Processes Responsible for the Southern Hemisphere Ocean Heat Uptake and Redistribution under Anthropogenic Warming. *Journal of Climate*, 33(9), 3787-3807.
22. Hayashida, H., R.J. Matear, P. G. Strutton and **X. Zhang**, 2020: Insights into projected changes in marine heatwaves from a high-resolution ocean circulation model. **Nature Communications**, 11, 4352, doi.org/10.1038/s41467-020-18241-x.
23. Han, W., D. Stammer, P. Thompson, T. Ezer, H. Palanisamy, **X. Zhang**, C. M. Domingues, L. Zhang and D. Yuan, 2019: Impacts of Basin-Scale Climate Modes on Coastal Sea Level: a Review. *Surveys in Geophysics*, 40, 1493-1541.
24. Todd, A., L. Zanna, M. Couldrey, J. Gregory, Q. Wu, J. A. Church, R. Farneti, R. Navarro-Labastida, K. Lyu, O. Saenko, D. Yang and **X. Zhang**, 2020: Ocean-only FAFMIP: understanding regional patterns of ocean heat content and dynamic sea level change. *Journal of Advances in Modelling Earth Systems*, 12(8), doi.org/10.1029/2019MS002027.
25. ♦Li, Z., N. J. Holbrook, **X. Zhang**, E. J. Oliver and E. A. Cougnon, 2019: Remote forcing of Tasman Sea marine heatwaves. *Journal of Climate*, 33 (12), 5337-5354.
26. Van de Wal, R.S.W., **X. Zhang**, S. Minobe, S. Jevrejeva, R.E.M. Riva, C. Little, K. Richter and M. Palmer, 2019: Uncertainties in long-term process-based coastal sea-level projections, *Surveys in Geophysics*, 40, 1655-1671, doi: 10.1007/s10712-019-09575-3.
27. Ponte, R. and co-authors, 2019: Towards comprehensive observing and modeling systems for monitoring and predicting regional to coastal sea level, *Frontiers in Marine Science*, 6:437, doi: 10.3389/fmars.2019.00437.
28. ♦Wu, Q., †**X. Zhang**, J. A. Church and †J. Hu, 2019: ENSO-related Global Ocean Heat Content Variations, *Journal of Climate*, 32, 45-68, doi:10.1175/JCLI-D-17-0861.1.
29. Timmermann, A., S.-I. An, J.-S. Kug, F.-F. Jin, W. Cai, A. Capotondi, K. Cobb, M. Lengaigne, M. J. McPhaden, M. F. Stuecker, K. Stein, A. T. Wittenberg, K.-S. Yun, T. Bayr, H.-C. Chen, Y. Chikamoto, B. Dewitte, D.

- Dommenget, P. Grothe, E. Guilyardi, Y.-G. Ham, T. Li, J.-J. Luo, S. McGregor, Y. Planton, S. Power, H. Rashid, H.-L. Ren, A. Santoso, K. Takahashi, A. Todd, G. Wang, G. Wang, R. Xie, W.-H. Yang, S.-W. Yeh, J. Yoon, E. Zeller, and **X. Zhang**, 2018: El Niño - Southern Oscillation Complexity, *Nature*, 559, 535-545, doi: 10.1038/s41586-018-0252-6.
30. Hobday, A. J., C. M. Spillman, P. Eveson, J. Hartog, **X. Zhang** and S. Brodie, 2018: A framework for combining seasonal forecasts and climate projections to aid risk management for fisheries and Aquaculture, *Front. Mar. Sci.*, 5, 137, doi: 10.3389/fmars.2018.00137.
31. **Zhang, X.** J. A. Church, D. Monselesan and K. McInnes, 2017: Sea Level Projections for Australian Coasts in the 21st Century, *Geophys. Res. Lett.*, 44, 8481–8491, doi:10.1002/2017GL074176.
32. †Chen, X., †**X. Zhang**, J. A. Church, M. A. King, C. S. Watson, D. Monselesan, B. Legresy and C. Harig, 2017: The increasing rate of global mean sea-level rise during 1993-2014, *Nature Climate Change*, 7, 492-495, doi:10.1038/NCLIMATE3325.
33. Bowen, M., J. Markham, P. Sutton, **X. Zhang**, Q. Wu, N. Shears and D. Fernandez, 2017: Interannual variability of sea surface temperature in the South West Pacific and the role of ocean dynamics, *Journal of Climate*, 30, 7481-7492, doi: 10.1175/JCLI-D-16-0852.1.
34. ♦Lyu, K., **X. Zhang**, J. A. Church, J. Hu and J.-Y. Yu, 2017: Distinguishing Basin-scale Modes of the Quasi-decadal and Multi-decadal Sea Level Variations in the Pacific, *Journal of Climate*, 30, 5097-5117, doi: 10.1175/JCLI-D-17-0004.1.
35. Feng, M., **X. Zhang**, B. Sloyan and M. Chamberlain, 2017: Contribution of the deep ocean to the future changes of the Indonesian Throughflow, *Geophys. Res. Lett.*, 44, 2859–2867, doi:10.1002/2017GL072577.
36. ♦Wu, Q., †**X. Zhang**, J. A. Church and J. Hu, 2017: Variability and change of sea level and its components in the Indo-Pacific during the altimeter era, *Journal of Geophysical Research*, 122, 1862–1881, doi:10.1002/2016JC012345.
37. Feng, M., **X. Zhang**, P. Oke, D. Monselesan, M. Chamberlain, R. Matear and A. Schiller, 2016: Invigorating ocean boundary current systems around Australia during 1979-2014 – as simulated in a near-global eddy-resolving ocean model, *Journal of Geophysical Research*, 121, 3395–3408, doi:10.1002/2016JC011842.
38. **Zhang, X.**, P. Oke, M. Feng, M. Chamberlain, J. Church, D. Monselesan, C. Sun, R. Matear, A. Schiller, and R. Fiedler, 2016: a near-global eddy-resolving OGCM for climate studies. *Geoscientific Model Development Discussions*, doi:10.5194/gmd-2016-17.
39. ♦Lyu, K., †**X. Zhang**, J. A. Church and J. Hu, 2016: Evaluation of the interdecadal variability of sea surface temperature and sea level in the Pacific in CMIP3 and CMIP5 models, *International Journal of Climatology*, 36: 3723–3740, doi: 10.1002/joc.4587.
40. ♦Lyu, K., †**X. Zhang**, J. A. Church, and J. Hu, 2015: Quantifying internally generated and externally forced climate signals at regional scales in CMIP5 models, *Geophys. Res. Lett.*, 42, 9394–9403.
41. ♦Slangen, A. B. A., J. A. Church, **X. Zhang**, and D. P. Monselesan, 2015: The Sea Level Response to External Forcings in Historical Simulations of CMIP5 Climate Models. *Journal of Climate*, 28, 8521–8539.
42. McInnes, K. L., J. A. Church, D. Monselesan, J. R. Hunter, J. G. O’Grady, I. D. Haigh, **X. Zhang**, 2015: Information for Australian Impact and Adaptation Planning in response to Sea-level Rise, *Australian Meteorological and Oceanographic Journal*, 65:1, 127–149.
43. ♦Lyu, K., †**X. Zhang**, J. A. Church, A. B. A. Slangen and J. Hu, 2014: Time of emergence for regional sea-level change, *Nature Climate Change*, 4, 1006-1010, doi:10.1038/NCLIMATE2397.
44. ♦Slangen, A. B. A., J. A. Church, **X. Zhang**, and D. Monselesan, 2014: Detection and attribution of global mean thermosteric sea level change. *Geophys. Res. Lett.*, 41, 5951-5959, doi:10.1002/2014GL061356.

45. **Zhang, X.**, J. A. Church, S. M. Platten, and D. Monselesan, 2014: Projection of subtropical circulation and associated sea-level changes in the Pacific ocean based on CMIP3 climate models. *Climate Dynamics*, 43, 131–144, doi:10.19007/s00382-013-192-x.
46. White, N. J., I. D. Haigh, J. A. Church, T. Koen, C. S. Watson, T. Pritchard, P. J. Watson, R. J. Burgette, M. Eliot, K. L. McInnes, B. You, **X. Zhang** and P. Tregoning, 2014: Australian sea levels – trends, regional variability and influencing factors, *Earth Science Reviews*, 136, 155-174, doi:10.1016/j.earscirev.2014.05.011.
47. Griffies, S. M. and coauthors, 2014: An assessment of global and regional sea level for years 1993–2007 in a suite of interannual CORE-II simulations. *Ocean Modelling*, doi:10.1016/j.ocemod.2014.03.004.
48. Hunter, J. R., J. A. Church, N. J. White and **X. Zhang**, 2013: Towards a global regionally varying allowance for sea-level rise. *Ocean Engineering*, 71, 17-27.
49. **Zhang, X.** and J. A. Church, 2012: Sea level trends, interannual and decadal variability in the Pacific Ocean. *Geophys. Res. Lett.*, **39**, L21701, doi:10.1029/2012GL053240.
50. **Zhang, X.**, B. Cornuelle and D. Roemmich, 2012: Sensitivity of western boundary transport at the mean North Equatorial Current bifurcation latitude to wind forcing. *Journal of Physical Oceanography*, 42, 2056-2072.
51. **Zhang, X.**, B. Cornuelle and D. Roemmich, 2011: Adjoint sensitivity of Niño-3 surface temperature to wind forcing. *Journal of Climate*, 24, 4480-4493.
52. **Zhang, X.** and M. J. McPhaden, 2010: Surface layer heat balance in the eastern equatorial Pacific Ocean on interannual time scales: Influence of local versus remote wind forcing, *Journal of Climate*, 23, 4375-4394.
53. McPhaden, M. J., and **X. Zhang**, 2009: Asymmetry in zonal phase propagation of ENSO sea surface temperature anomalies, *Geophys. Res. Lett.*, 36, L13703, doi:10.1029/2009GL038774.
54. **Zhang, X.**, and M. J. McPhaden, 2008: Eastern equatorial Pacific forcing of ENSO sea surface temperature anomalies, *Journal of Climate*, 21, 6070-6079.
55. McPhaden, M. J., **X. Zhang**, H. H. Hendon and M. C. Wheeler, 2006: Large scale dynamics and MJO forcing of ENSO variability, *Geophys. Res. Lett.*, 33, L16702, doi: 10.1029/2006GL026786.
56. **Zhang, X.**, and M. J. McPhaden, 2006: Wind stress variations and interannual sea surface temperature anomalies in the eastern equatorial Pacific, *Journal of Climate*, 19, 226-241.

Peer-reviewed Book Chapter Publication (selected)

57. Church, J. A. and **X. Zhang**, 2023: Sea-level Rise and Estuaries, Chapter 4 in *Climate Change and Estuaries*, edited by M. M. Kennish, H. W. Paerl, and J. R. Crosswell, CRC Press, Taylor & Francis Group, ISBN: 9780367647520.
58. Holbrook, N.J., D.C. Claar, A.J. Hobday, K.L. McInnes, E.C. Oliver, A. Sen Gupta, M.J. Widlansky, and **X. Zhang**, 2020: Chapter 18: Ocean Extremes and Habitat Impacts. AGU Monograph: ENSO in a Changing Climate, edited by M. J. McPhaden, A. Santoso and W. Cai, Geophysical Monograph Series, ISBN: 9781119548164

Conference/workshop Presentations (selected, since 2017 only)

1. **Zhang, X.**, Future sea levels, *Sea Level Winter School organized by Australian Centre for Excellence in Antarctic Science (ACEAS) and Australian Antarctic Program Partnership (AAPP) jointly*, June 2024, Spring Bay Mill, Tasmania, Australia [Lecture]
2. **Zhang, X.**, Ice sheets and sea levels, *Australian Community Climate and Earth System Simulator – National Research Infrastructure (ACCESS-NRI) Annual workshop*, September 2023, Canberra, Australia. [**Invited talk**]

3. **Zhang, X.**, 1: Understanding historical Australian sea level trends and variability (**Invited**); 2: Roles of surface forcing in the Southern Ocean temperature and salinity changes under increasing CO₂, *28th IUGG General Assembly*, July 2023, Berlin, Germany. [**Invited talk**]
4. **Zhang, X.**, Understanding and projecting sea level changes: progress and gaps, July 2023, University of Hamburg, Hamburg, Germany [Seminar talk]
5. **Zhang, X.**, A practical modelling framework to understand teleconnections and tease out underlying mechanisms, *CLIVAR workshop on the tropical Pacific and its inter-basin interactions*, Feb 2023, Monash University, Australia. [Oral]
6. **Zhang, X.**, Progress in Regional Sea Level Projections, *WCRP Sea Level 2022 Conference*, July 2022, Singapore [**Invited keynote talk**]
7. **Zhang, X.**, Understanding and projecting sea-level rise, *The Second Fudan International Workshop on Atmospheric Science Frontier (FIWAS)*, July 2022. [**Invited talk online**]
8. **Zhang, X.**, M. Feng, R. J. Matear and A. J. Hobday, Dynamical downscaling of future changes in the Tasman Sea – a climate change hot spot, *Ocean Science Meeting*, February 2020, San Diego, US. [Oral]
9. **Zhang, X.**, Tasman Sea: long-term warming and marine heatwaves, *PICES WG-40 - CLIVAR Pacific Region Panel joint meeting*, October 2019, Victoria, Canada [Oral]
10. **Zhang, X.**, 1: Future Projections of Ocean Gyre Circulation and Dynamic Sea level; 2: Processes Responsible for the Southern Hemisphere Ocean Heat Uptake and redistribution under anthropogenic warming, *27th IUGG General Assembly*, July 2019, Montreal, Canada. [Oral]
11. **Zhang, X.**, Heat uptake in the Southern Ocean and its relationship with atmospheric forcing, *Flux-Anomaly-Forced Model Intercomparison Project (FAFMIP) workshop*, April 2019, University of Reading, UK [Oral]
12. **Zhang, X.**, Sea-level Rise: Global and Regional, *Climate Adaptation and Resilience (CARE2018) Hong Kong Conference*, Oct 2018, Hong Kong [**Invited talk** with all costs covered]
13. **Zhang, X.**, K. Lyu and J. A. Church, Projected changes of ocean gyre circulation and related sea level patterns, *AOGS annual meeting*, June 2018, Honolulu, USA. [Oral]
14. **Zhang, X.**, and K. Lyu, Quantification of open ocean vs. coastal sea level variance related to different climate modes, as function of region and timescale, *International Space Science Institute (ISSI) Workshop “Understanding the relationship between coastal sea level and large-scale ocean circulation”*, March, 2018, Bern, Switzerland. [**Invited talk** with local costs covered]
15. **Zhang, X.**, J. Church, A. Slangen, D. Monselesan and K. McInnes, High Resolution Sea Level Projections in the 21st Century, *WCRP/IOC 2017 Regional Sea Level Changes and Coastal Impacts Conference*, July 2017, New York, USA. [**Plenary talk**]
16. **Zhang, X.**, Dynamical downscaling of climate changes with a near-global 1/10° OGCM, *Flux-Anomaly-Forced Model Intercomparison Project (FAFMIP) workshop*, July 2017, NOAA/GFDL, Princeton, USA. [Oral]



(Updated in January 2025)