

## Sen Zhao

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### RESEARCH INTERESTS

Climate variability, dynamics, and predictability; Climate impacts and change; multi-scale interactions of the Earth system; El Niño-Southern Oscillation; Climate modeling; Seasonal forecast; Wave dynamics and atmospheric teleconnections; Paleoclimate

### EDUCATION

<b>Ph.D. Meteorology, Institute of Atmospheric Physics, Chinese Academy of Sciences</b>	2016
<b>B.S. Atmospheric Sciences, Lanzhou University</b> (Graduated with Honors)	2011

### PROFESSIONAL APPOINTMENTS

<b>University of Hawai'i at Mānoa, Honolulu, HI, USA</b> Assistant Researcher at School of Ocean and Earth Science and Technology (SOEST)	11/2021 – Present
<b>University of Hawai'i at Mānoa, Honolulu, HI, USA</b> Postdoctoral Fellow at Department of Atmospheric Sciences. Mentor: Fei-Fei Jin	09/2016 – 10/2021
<b>Institute of Atmospheric Physics Chinese Academy of Sciences, Beijing, China</b> Research Assistant at State Key Laboratory of Numerical Modeling for Atmospheric Sciences and Geophysical Fluid Dynamics (LASG). Advisor: Jianping Li	09/2011 – 09/2016

### OTHER PROFESSIONAL POSITION

Associate Editor for <i>npj Climate and Atmospheric Science</i> (Nature partner journal)	05/2025 – Present
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### GRANTS

- **NSF grant** (2024-2027), *Dynamics and predictability of coastal El Nino events, and implications for ENSO diversity*, C. Karamperidou (lead PI) and **S. Zhao (co-PI)**, budget \$644,460.
- **NOAA MAPP grant** (2023–2026), *Developing Dynamically Constrained Projections of ENSO Activity and Associated Coastal Hazards – An Application to the Hawaiian and US-Affiliated Pacific Islands*. F.-F. Jin (lead PI), M. Stuecker, N. Li, A. Wittenberg, J. Boucharel., Z. Yang, **S. Zhao (Co-I)**.
- **DOE grant** (pending), *Quantifying and Understanding Ocean Biogeochemistry-ENSO/TIW Interactions & Feedbacks in Earth System Models*, F.-F. Jin (lead PI), M. Stuecker, F. M. Hoffman, A. Wittenberg, **S. Zhao (Co-I)**.

### SELECTED SCHOLARSHIPS, HONORS AND AWARDS

- **National Scholarship** (2013), Ministry of Education of China, No. 50257
- **Outstanding Student Leader** (2012, 2013, 2014), University of the Chinese Academy of Sciences
- **Outstanding Student** (2012, 2013, 2014, 2015), University of the Chinese Academy of Sciences
- **Outstanding Graduate** (2011), Lanzhou University
- **China National Encouragement Scholarship** (2008, 2010)
- **Contemporary Undergraduate Mathematical Contest in Modeling Award** (2009), National Second Prize and Special Prize of Gansu Province, CSIAM
- **First Class Scholarship of Lanzhou University** (2009)

**PUBLICATIONS**ORCID: [0000-0002-5597-1109](https://orcid.org/0000-0002-5597-1109)[Google Scholar](https://scholar.google.com/citations?user=SenZhao) (citations 2000+, H-index 22 by April 20, 2025)**Peer-reviewed book chapter**

- Jin F.-F., H.-C. Chen, **S. Zhao**, M. Hayashi, C. Karamperidou, M. F. Stuecker, R. Xie, and L. Geng (2020): [Simple ENSO Models](#). In: Santoso A, Cai W, McPhaden MJ (eds) [El Niño Southern Oscillation in a Changing Climate](#), 119-151. ([SOEST News](#))

**Peer-reviewed journal articles**

52. Iwakiri, T., J.-S. Kug, F.-F. Jin, **S. Zhao**, S.-I. An, G.-I. Kim, and D. Park (2025): Abrupt shift of El Niño periodicity under CO<sub>2</sub> mitigation. *PNAS*, *in press*.
51. **Zhao, S.**, N. Li, F.-F. Jin, K. F. Cheung, Z. Yang (2025): [Contrast and Predictability of Island-scale El Niño Influences on Hawaii Wave Climate](#), *Geophys. Res. Lett.*, 52, e2024GL113127.
50. Vialard, J., F.-F. Jin, M. J. McPhaden, A. Fedorov, W. Cai, S.-I. An, D. Domménget, X. Fang, M. F. Stuecker, C. Wang, A. Wittenberg, **S. Zhao**, F. Liu, S.-K. Kim, Y. Planton, T. Geng, M. Lengaigne, A. Capotondi, N. Chen, L. Geng, S. Hu, T. Izumo, J.-S. Kug, J.-J. Luo, S. McGregor, B. Pagli, P. Priya, S. Stevenson, and S. Thual (2025): [The El Niño Southern Oscillation \(ENSO\) Recharge Oscillator Conceptual Model: Achievements and Future Prospects](#), *Reviews of Geophysics*, 63(1), e2024RG000843.
49. Kajakokulan, P., A. Santoso, and **S. Zhao** (2025): [Asymmetric response of Sri Lanka Northeast Monsoon rainfall to El Niño/La Niña](#), *Climate Dyn.*, 63, 101.
48. Zhao, S.-Y., R. Fu, **S. Zhao**, F.-F. Jin, and H. Wang (2025): [Cross-equatorial Extension of the Pacific-South American Wave Train Enabled by Southeastern South American Rainfall](#), *Climate Dyn.*, 63 (1), 5.
47. Gunnarson, J. L., M. F. Stuecker, and **S. Zhao** (2024): [Drivers of Future Extratropical Sea Surface Temperature Variability Changes in the North Pacific](#). *npj Climate and Atmospheric Science*, 7(1), 1-11.
46. **Zhao, S.**, F.-F. Jin, M. F. Stuecker, P. R. Thompson, J.-S. Kug, M. J. McPhaden, M.A. Cane, A. T. Wittenberg, and W. Cai (2024): [Explainable El Niño Predictability from Climate Mode Interactions](#). *Nature*, 630(8018), 891-898. ([NSF Stories](#), [NOAA MAPP News](#), [UH News](#), [SOEST News](#), [Meteored UK News](#), [EurekAlert!](#))
45. Tang, X., J. Li, Y. Zhang, Y. Li, and **S. Zhao** (2023): [Synergistic Effect of El Niño and Negative Phase of North Atlantic Oscillation on Winter Precipitation in the Southeastern United States](#). *J. Climate*, 36(6), 1767–1791.
44. Shi, F., H. Goosse, J. Li, Q. Yin, F. Ljungqvist, T. Lian, C. Sun, L. Wang, Z. Wu, J. Li, **S. Zhao**, C. Xu, W. Liu, T. Liu, T. Nakatsuka, and Z. Guo (2022): [Interdecadal to multidecadal variability of East Asian summer monsoon over the past half millennium](#). *J. Geophys. Res.: Atmos.*, 127 (30), e2022JD037260.
43. Shi, F., C. Sun, A. Guion, Q. Yin, **S. Zhao**, T. Liu, and Z. Guo (2022): [Roman Warm Period and Late Antique Little Ice Age in an Earth System Model Large Ensemble](#). *J. Geophys. Res.: Atmos.*, 127(16), e2021JD035832.
42. **Zhao, S.**, and C. Karamperidou (2022): [Competing Effects of Eastern and Central-Western Pacific Winds in the Evolution of the 2017 Extreme Coastal El Niño](#). *Geophys. Res. Lett.*, 49(15), e2022GL098859.
41. Li, X., Z.-H. Hu, **S. Zhao**, R. Ding, and B. Zhang (2022): [On the asymmetry of the tropical Pacific thermocline fluctuation associated with ENSO recharge and discharge](#). *Geophys. Res. Lett.*, 49(11), e2022GL099242.
40. Tang X., J. Li, H. Zhang, and **S. Zhao** (2022): [Representation of Rossby wave propagation and its effect on the teleconnection between the Indian summer monsoon and extratropical rainfall in the Met Office Unified Model](#). *Climate Dyn.*, 58 (3), 907-924
39. **Zhao, S.**, F.-F. Jin, and M. F. Stuecker (2021): [Understanding Lead Times of Warm-Water-Volumes to ENSO Sea Surface Temperature Anomalies](#). *Geophys. Res. Lett.*, 48(19), e2021GL094366.
38. Chen H.-C., F.-F. Jin, **S. Zhao**, A. T. Wittenberg, and S. Xie (2021): [ENSO Dynamics in the E3SM-1-0, CESM2, and GFDL-CM4 Climate Models](#). *J. Climate*, 34 (23), 9365-9384.
37. **Zhao, S.**, F.-F. Jin, X. Long, and M. Cane (2021): [On the Breakdown of ENSO’s Relationship with Thermocline Depth in the Central-Equatorial Pacific](#). *Geophys. Res. Lett.*, 48(9), e2020GL092335.

36. Zhou, X., Q. Chen, Z. Wang, M. Xu, **S. Zhao**, Z. Cheng, and F. Feng (2020): [Longer duration of the weak stratospheric vortex during extreme El Niño events linked to spring Eurasian coldness](#). *J. Geophys. Res.: Atmos.*, 125(16), e2019JD032331.
35. Liu, T., J. Li, Q. Wang, **S. Zhao** (2020): [Influence of the Autumn SST in the Southern Pacific Ocean on Winter Precipitation in the North American Monsoon Region](#). *Atmosphere*, 11(8), 844.
34. Tseng, Y., R. Ding, **S. Zhao**, Y. Kuo, and Y. Liang (2020): [Could the North Pacific Oscillation Be Modified by the Initiation of East Asian Winter Monsoon?](#) *J. Climate*, 33, 2389–2406.
33. Xue, A., F.-F. Jin, W. Zhang, J. Boucharel, **S. Zhao**, and X. Yuan (2020): [Delineating the Seasonally Modulated Nonlinear Feedback onto ENSO from Tropical Instability Waves](#). *Geophys. Res. Lett.*, 47(7), e2019GL085863.
32. **Zhao, S.**, M. F. Stuecker, F.-F. Jin, J. Feng, H. Ren, W. Zhang, and J. Li (2020): [Improved Predictability of the Indian Ocean Dipole using a Stochastic-Dynamical Model compared to the North American Multi-model Ensemble Forecast](#). *Wea. Forecasting*, 35(2), 379–399.
31. Zhang Y., J. Li, **S. Zhao**, F. Zheng, J. Feng, Y. Li, Y. Xu (2020): [Indian Ocean tripole mode and its associated atmospheric and oceanic processes](#). *Climate Dyn.*, 55(5), 1367–1383.
30. Feng, J., J. Li, F.-F. Jin, Z. Liu, and **S. Zhao** (2019): [Effect of El Niño on the Response Ratio of Hadley Circulation to Different SST Meridional Structures](#). *Climate Dyn.*, 53, 3877–3891.
29. **Zhao, S.**, F.-F. Jin, and M. F. Stuecker (2019): [Improved Predictability of the Indian Ocean Dipole Using Seasonally Modulated ENSO Forcing Forecasts](#). *Geophys. Res. Lett.*, 46(16), 9980–9990.
28. Wang, Q., J. Li, Y. Li, J. Xue, **S. Zhao**, Y. Xu, Y. Wang, Y. Zhang, D. Dong, and J. Zhang (2019): [Modulation of tropical cyclone tracks over the western North Pacific by intra-seasonal Indo-western Pacific convection oscillation during the boreal extended summer](#). *Climate Dyn.*, 52(1-2), 913–927.
27. **Zhao, S.**, J. Li, Y. Li, F.-F. Jin, and J. Zheng (2019): [Interhemispheric Influence of Indo-Pacific Convection Oscillation on Southern Hemisphere Rainfall through Southward Propagation of Rossby Waves](#). *Climate Dyn.*, 52(5), 3203–3221.
26. Shi, F., H. Goosse, F. Klein, **S. Zhao**, T. Liu, and Z. Guo (2019): [Monopole mode of precipitation in East Asia modulated by the South China Sea over the last four centuries](#). *Geophys. Res. Lett.*, 46(24), 14713–14722.
25. Li, Y., J. Feng, J. Li, and **S. Zhao** (2018): [The Circle Diagram in the Group Velocity Domain for Rossby Wave under the Horizontally Non-Uniform Flow](#). *SOLA*, 14, 121–125.
24. Li, Y., J. Li, F. Kucharski, J. Feng, **S. Zhao**, and J. Zheng (2018): [Two Leading Modes of the Interannual Variability in South American Surface Air Temperature during Austral Winter](#). *Climate Dyn.*, 51(5-6), 2141–2156.
23. Liu, T., J. Li, Y. Li, **S. Zhao**, F. Zheng, J. Zheng, and Z. Yao (2018): [Influence of the May Southern Annular Mode on the South China Sea Summer Monsoon](#). *Climate Dyn.*, 51(11-12), 4095–4107.
22. Feng, J., J. Li, F.-F. Jin, **S. Zhao**, and J. Zhu (2018): [Relationship between the Hadley circulation and different tropical meridional SST structures during boreal summer](#). *J. Climate*, 31(16), 6575–6590.
21. Stuecker, M. F., C. M. Bitz, K. C. Armour, C. Proistosescu, S. M. Kang, S.-P. Xie, D. Kim, S. McGregor, W. Zhang, **S. Zhao**, W. Cai, Y. Dong, and F.-F. Jin (2018): [Polar Amplification Dominated by Local Forcing and Feedbacks](#). *Nature Climate Change*, 8(12), 1076–1081. ([Nature News & Views](#), [EurekAlert!](#), [SOEST News](#))
20. Xue, J., J. Li, C. Sun, **S. Zhao**, J. Mao, D. Dong, Y. Li, and J. Feng (2018): [Decadal-Scale Teleconnection between South Atlantic SST and Southeast Australia Surface Air Temperature in Austral Summer](#). *Climate Dyn.*, 50(7-8), 2687–2703.
19. Zhou, X., J. Li, F. Xie, R. Ding, Y. Li, **S. Zhao**, J. Zhang, and Y. Li (2018): [The Effects of the Indo-Pacific Warm Pool on the Stratosphere](#). *Climate Dyn.*, 51(11-12), 4043–4064.
18. Huyan, L., J. Li, **S. Zhao**, C. Sun, D. Dong, T. Liu, and Y. Zhao (2017): [The Impact of Layer Perturbation Potential Energy on the East Asian Summer Monsoon](#). *J. Climate*, 30(17), 7087–7103.

17. Tian, W., Y. Li, F. Xie, J. Zhang, M. P. Chipperfield, W. Feng, Y. Hu, **S. Zhao**, X. Zhou, Y. Yang, and X. Ma (2017): [The relationship between lower-stratospheric ozone at southern high latitudes and sea surface temperature in the East Asian marginal seas in austral spring](#). *Atmos. Chem. Phys.*, 17(11), 6705–6722.
16. Xie, F., J. Li, J. Zhang, W. Tian, Y. Hu, **S. Zhao**, C. Sun, R. Ding, J. Feng, and Y. Yang (2017): [Variations in North Pacific Sea Surface Temperature Caused by Arctic Stratospheric Ozone Anomalies](#). *Environ. Res. Lett.*, 12(11), 114023.
15. Shi, F., **S. Zhao**, Z. Guo, H. Goosse, and Q. Yin (2017): [Multi-proxy reconstructions of May–September precipitation field in China over the past 500 years](#). *Clim. Past*, 13(12), 1919–1938.
14. Stuecker, M. F., A. Timmermann, F.-F. Jin, Y. Chikamoto, W. Zhang, A. T. Wittenberg, E. Widiastih, and **S. Zhao** (2017): [Revisiting ENSO/Indian Ocean Dipole Phase Relationships](#). *Geophys. Res. Lett.*, 44(5), 2481–2492. (AGU Editor's Highlight)
13. Feng, J., J. Li, F.-F. Jin, **S. Zhao**, and F. Xie (2017): [The responses of the Hadley circulation to different meridional SST structures in the seasonal cycle](#). *J. Geophys. Res.: Atmos.*, 122(15), 7785–7799.
12. Qin, J., R. Ding, Z. Wu, J. Li, and **S. Zhao** (2017): [Relationships between the extratropical ENSO precursor and leading modes of atmospheric variability in the Southern Hemisphere](#). *Adv. Atmos. Sci.*, 34(3), 360–370.
11. Ding, R., J. Li, Y.-h. Tseng, K.-J. Ha, **S. Zhao**, and J.-Y. Lee (2016): [Interdecadal change in the lagged relationship between the Pacific–South American pattern and ENSO](#). *Climate Dyn.*, 47(9–10), 2867–2884.
10. Yang, F., N. Wang, F. Shi, F. C. Ljungqvist, **S. Zhao**, and T. Liu (2016): [The spatial distribution of precipitation over the West Qinling region, China, AD 1470–2000](#). *Palaeogeogr. Palaeoclimatol. Palaeoecol.*, 443, 278–285.
9. Zheng, F., J. Li, Y. Li, **S. Zhao**, and D. Deng (2016): [Influence of the Summer NAO on the Spring-NAO-Based Predictability of the East Asian Summer Monsoon](#). *J. Appl. Meteor. Climatol.*, 55(7), 1459–1476.
8. Zheng, J., Q. Wu, Y. Guo, and **S. Zhao** (2016): [The Impact of Summertime North Indian Ocean SST on Tropical Cyclone Genesis over the Western North Pacific](#). *SOLA*, 12, 242–246.
7. Kazmi, D. H., J. Li, C. Ruan, **S. Zhao**, and Y. Li (2016): [A Statistical Downscaling Model for Summer Rainfall over Pakistan](#). *Climate Dyn.*, 47(7–8), 2653–2666.
6. **Zhao, S.**, J. Li, and C. Sun (2016): [Decadal Variability in the Occurrence of Wintertime Haze in Central Eastern China Tied to the Pacific Decadal Oscillation](#). *Sci. Rep.*, 6, 27424. (Top 100 read Scientific Reports articles in 2016)
5. Shi, F., Q. Ge, B. Yang, J. Li, F. Yang, F. C. Ljungqvist, O. Solomina, T. Nakatsuka, N. Wang, **S. Zhao**, C. Xu, K. Fang, M. Sano, G. Chu, Z. Fan, N. P. Gaire, and M. U. Zafar (2015): [A Multi-Proxy Reconstruction of Spatial and Temporal Variations in Asian Summer Temperatures over the Last Millennium](#). *Climatic Change*, 131(4), 663–676.
4. Zhu, G., W. Lin, **S. Zhao**, and Y. Cao (2015): [Spatial and temporal variation characteristics of ocean waves in the South China Sea during the boreal winter](#). *Acta Oceanol. Sin.*, 34(1), 23–28.
3. Sun, C., J. Li, and **S. Zhao** (2015): [Remote Influence of Atlantic Multidecadal Variability on Siberian Warm Season Precipitation](#). *Sci. Rep.*, 5, 16853.
2. Li, Y., J. Li, F.-F. Jin, and **S. Zhao** (2015): [Interhemispheric Propagation of Stationary Rossby Waves in a Horizontally Nonuniform Background Flow](#). *J. Atmos. Sci.*, 72(8), 3233–3256.
1. **Zhao, S.**, J. Li, and Y. Li (2015): [Dynamics of an Interhemispheric Teleconnection across the Critical Latitude through a Southerly Duct during Boreal Winter](#). *J. Climate*, 28(19), 7437–7456.

### Non-Refereed Articles

- **Zhao, S.** and F.-F. Jin (2024): [A minimalistic model achieves long-range explainable El Nino forecasts with high accuracy](#), *Nature*, Research Briefings, <https://doi.org/10.1038/d41586-024-02335-3>

### ***Thesis***

- **Zhao, S.**, 2016: [\*Theory of Cross-Equatorial Propagation of Planetary Wave in Horizontally Non-Uniform Basic Flow and Its Applications in Atmospheric Teleconnections\*](#), PhD Dissertation, University of Chinese Academy of Sciences
- **Zhao, S.**, 2011: [\*Evaluation of WRF microphysics and cumulus schemes in simulating Hurricane Katrina\*](#), Undergraduate thesis, Lanzhou University

### ***Submitted/In Revision***

- Mei, Z., S. Lin, ..., **S. Zhao**,...: Identifying key convection sensitive oceanic regions to weaken the ENSO Spring Predictability Barrier, *submitted*.
- Liu, F., J. Vialard, ..., **S. Zhao**, ...: ENSO cycles mostly after extreme El Niño events. *submitted*.
- Feng, J., J.-X. Li, F.-F. Jin, **S. Zhao**, J. Li: Equatorward migration of heatwave locations across continents. *submitted*.
- Boucharel, J., R. Almar, F.-F. Jin, **S. Zhao**, M. Stuecker, B. Dewitte: Skillful seasonal predictions of coastal risks from climate modes interactions. *submitted*.
- Xue, H., F. Shi, J. Li, **S. Zhao**, F.-F. Jin, X. Zhang, L. Geng, W. Liu, Q. Yin, Z. Guo (2024). Pronounced El Niño response to tropical western Pacific volcanic eruptions over the past millennium. *In revision*.

### ***In Preparation***

- Kim, S.-K., **S. Zhao**, et al.: The Community Recharge Oscillator Model. In preparation for *Geoscientific Model Development*.
- **Zhao, S.**, P. R. Thompson, F.-F. Jin: Influence of ENSO on the compounding effect of sea level and ocean waves.
- **Zhao, S.**, F.-F. Jin: A Robust Assessment of the Bjerknes-Wyrtki-Jin Indices for ENSO Linear Stability and Periodicity.

## **PRESENTATIONS**

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### ***Oral Conference and Workshop Presentations***

- Conditional ENSO Predictability from Equatorial Pacific and Pan-Tropical States, *Wyrtki Symposium 2025*, Honolulu, HI, 12-14 March 2025
- A Minimalistic Model Achieves Long-range Explainable ENSO Forecasts with High Accuracy, *AGU24 Meeting*, Washington, D.C., 9-13 December 2024
- Competing Effects of Eastern and Central-Western Pacific Winds in the Evolution of the 2017 Extreme Coastal El Niño and Implication for El Niño Diversity, *IRCC-KIST-IPRC Joint Workshop on Climate Change and Prediction*, East West Center, Honolulu, 01/2023
- Understanding Lead Times of Warm-Water-Volumes to ENSO Sea Surface Temperature Anomalies, *SIO-UH Oahu Workshop on Ocean-Atmosphere Interactions and Climate Predictability*, Honolulu, 03/2022
- Dynamics and Implications for ENSO's Subsurface Ocean Temperature Vertical Dipole Anomalies in the Central Equatorial Pacific, *Ocean Science Meeting 2022*, Honolulu, 02/2022
- Improved Predictability of the Indian Ocean Dipole Using Seasonally Modulated ENSO Forcing, *AOGS 15th Annual Meeting*, Honolulu, June 03–08, 2018
- Decadal Variability in the Occurrence of Wintertime Haze in Central Eastern China Tied to the Pacific Decadal Oscillation, *AOGS 15th Annual Meeting*, Honolulu, June 03–08, 2018

### ***Invited Talks and Seminars***

- Advances in Understanding of ENSO's Relationship with Equatorial Pacific Thermocline, *Climate Dynamics Group Seminar, virtual*, 05/2022



- Advancing Understanding of ENSO's Relationship with Equatorial Pacific Thermocline, *Atmospheric Sciences Seminar, University of Hawai'i at Mānoa*, Honolulu, 09/2021

### ***Poster Presentations***

- Contrasting Island-scale El Niño Influences on Hawaii Wave Climate, *AGU24 Meeting*, Washington, D.C., 9-13 December 2024
- A robust assessment of the Bjerknes-Wyrtki-Jin indices for ENSO growth rate and periodicity, *AGU Fall Meeting 2019*, San Francisco, USA, December 9–13, 2019
- Interhemispheric influence of the Indo-Pacific convection oscillation on Southern Hemisphere rainfall, *AOGS 13th Annual Meeting*, Beijing, China, July 31–August 5, 2016
- Interhemispheric influence of the Indo-Pacific convection oscillation on Southern Hemisphere rainfall, *The 13th General Circulation Model Simulations of the East Asian Climate (EAC) workshop*, Beijing, China, March 24–25, 2016
- The Hemispheric Propagation of Stationary waves in Atmosphere, *EGU General Assembly 2013*, Vienna, Austria, April 7–12, 2013
- The Hemispheric Propagation of Stationary waves in Atmosphere, *ICDM Workshop 2012*, Kunming, China, August 6–9, 2012

## **TEACHING AND MENTORING**

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### ***Instructor/Co-Instructor***

- *Recharge Oscillator Practical: Simulations and Forecasting*, ENSO Winter School 2025, UH Mānoa, March 15-23, 2025
- *Introduction to Atmospheric Dynamics* (ATMO 303), UH Mānoa, fall 2024, Instructors: Jingxia Zhao, Sen Zhao, Licheng Geng
- *Dynamics of El Niño–Southern Oscillation Phenomenon* (ATMO 752), UH Mānoa, spring 2019, Instructor: Fei-Fei Jin

### ***Guest Lecturer***

- *Large-Scale Ocean-Atmosphere Interaction* (OCN 666 / ATMO 666), UH Mānoa, spring 2025, Instructors: Niklas Schneider, Malte Stuecker
- *Applied Atmospheric Dynamics* (ATMO 402), UH Mānoa, spring 2020, Instructor: Fei-Fei Jin
- *Applied Atmospheric Dynamics* (ATMO 402), UH Mānoa, spring 2019, Instructor: Fei-Fei Jin

### ***Informally Mentored Students***

- Pocheng Chen, UH Mānoa Atmospheric Sciences
- Jacob Gunnarson, UH Mānoa Oceanography
- Xinyi Yang, UH Mānoa Atmospheric Sciences
- Huihong Xue, Institute of Geology and Geophysics Chinese Academy of Sciences (now Université Catholique de Louvain)

## **PROFESSIONAL SERVICES AND ACTIVITIES**

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### ***Associate Editor for npj Climate and Atmospheric Science***

### ***Member/Contributor***

- CLIVAR working group: ENSO conceptual models (2022 – Present)

### **Organizing Committee**

- **Chair and Co-Convener**, AGU24 session OS015 - *El Niño-Southern Oscillation and Pantropical Climate Interactions: Mechanisms, Predictability, Impacts, and Projections*, Washington, D.C., 9-13 December 2024

### **Referees for international journals**

- *Nature*, *Nature Geoscience*, *Proceedings of the National Academy of Sciences*, *Science Advances*, *npj Climate and Atmospheric Science*, *Communications Earth & Environment*, *Geophysical Research Letters*, *Journal of Climate*, *Climate Dynamics*, *Atmospheric Chemistry and Physics*, *Environmental Research Letters*, *Journal of Geophysical Research-Atmosphere*, *Journal of Geophysical Research-Oceans*, *Journal of the Atmospheric Sciences*, *Scientific Reports*, *Deep-Sea Research Part I*, *Atmosphere*, *Theoretical and Applied Climatology*, *Progress in Oceanography*, *Scientific Online Letters on the Atmosphere*, *Agronomy Journal*, *Earth and Space Science*, *Frontiers of Earth Science*

### **Scientific Societies**

- American Geophysical Union (AGU), Asia Oceania Geosciences Society (AOGS), European Geosciences Union (EGU)

### **DEVELOPED MODELS AND TOOLKITS**

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- [Operational XRO ENSO forecast](#) adopted in [IRI ENSO Predictions Plume](#) since September 2024. The plume is maintained by the International Research Institute for Climate and Society (IRI) at Columbia University
- [An extended nonlinear recharge oscillator model \(XRO\)](#). The XRO exhibits skillful ENSO forecasts better than global climate models and comparable to the most skillful AI ENSO models.
- [A simple stochastic-dynamical IOD prediction system](#). The system exhibits generally higher skill and longer lead times for predicting IOD events than current operational forecast systems.
- [An intermediate tropical ocean model \(iTOM\)](#). This is a linear continuously stratified ocean model extended to all tropical oceans with a more realistic coastline and a space dependent background stratification, show improved performance than the Zebiak-Cane type ocean model.
- [Rossby wave ray and phase tracing](#). A software package for investigating the Rossby wave propagation and its phase evolution in a horizontally non-uniform basic flow.

### **SKILLS**

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#### ***Modeling using Earth System Models (NCAR CESM and GFDL models)***

- CESM1/2 OGCM POP2 momentum and buoyancy fluxes forced experiments
- CESM1/2 Fully coupled and slab-ocean experiments
- CESM AGCM SST/SIC sensitivity experiments and aqua-planet experiments
- GFDL CM2.1/CESM pacemaker experiments

#### ***Modeling using Intermediate and Simple Models***

- Linear Baroclinic Models
- Zebiak-Cane Coupled Model
- Intermediate tropical ocean model
- SPEEDY
- Gill-Matsuno Model
- Shallow Water Model for Global Ocean
- Barotropic Model
- Recharge Oscillator Model

***Machine Learning Methods***

- Deep learning with Convolutional Neural Network (CNN)

***Coding***

- Python, Fortran, Matlab, CDO, NCO, NCL, Ferret, Gnuplot, R, Linux Shells, LATEX, C++

***Languages***

- English, Mandarin (native)

Last updated: May 1, 2025