

# WEI ZHANG

Climate Scientist

Princeton University & NOAA GFDL & NOAA GSL

Phone: (+1) 305-773-2988 · (+86) 17521348820

Email: [wz19@princeton.edu](mailto:wz19@princeton.edu) · [zhang.wei@noaa.gov](mailto:zhang.wei@noaa.gov)

Website: <http://scholar.princeton.edu/weizhang>

---

---

## RESEARCH INTERESTS

Climate Variability and Prediction; Extreme Predictability; Air-Sea Interaction; High-Resolution Climate Modeling; Machine Learning

## EDUCATION

- Aug. 2015 - Aug. 2020      Ph. D. University of Miami  
Rosenstiel School of Marine and Atmospheric Science (RSMAS)  
Major: Meteorology and Physical Oceanography  
Advisor: Prof. Ben Kirtman  
Dissertation: Understanding Decadal Climate Predictability in the Global Ocean
- Sep. 2011 - Jul. 2015      B. S. Nanjing University (*Graduating with honor*)  
School of Geographic and Oceanographic Sciences  
Major: Ocean Science  
Advisor: Prof. Shaoming Pan  
Thesis: Study of Cs-137 Fallout and Reference Inventory in China (*Best Essay Award*)

## EMPLOYMENT

- Apr. 2021 - Present      Visiting Research Scientist  
NOAA Global Systems Laboratory (GSL)  
Advisor: Dr. Zoltan Toth
- Sep. 2020 - Present      Postdoctoral Research Associate  
Atmospheric and Oceanic Sciences Program, Princeton University, and  
NOAA Geophysical Fluid Dynamics Laboratory (GFDL)  
Advisors: Dr. Tom Knutson, Dr. Harris Lucas, Dr. Baoqiang Xiang

## GRANTS

- 2021      Principal Investigator of Microsoft AI for Earth Grant  
Research Project: *Developing a Deep Learning System for Multi-year ENSO Prediction*  
Collaborators: Dr. Ben Kirtman, Dr. Jia Geng (Amazon), Dr. Junfei Xia
- 2022      Collaborator of NOAA Project “*Transitioning NMME-based seasonal predictions of atmospheric river activity into an operational forecast product*” (NOAA-OAR-WPO-2022-2006969)  
Principle Investigators: Dr. Baoqiang Xiang, Dr. Nathaniel Johnson, Dr. Daniel Harnos

## RESEARCH EXPERIENCE

Jul. 2021 - present	Microsoft AI for Earth Grantee <i>Developing a Deep Learning System for Multi-year ENSO Prediction</i>
Apr. 2021 - present	Visiting Research Scientist at NOAA GSL <i>Predictability limit of the coupled ocean-atmosphere system and assessment of the energy replacement time</i>
Sep. 2020 - present	CIMES Postdoctoral Research Fellow at Princeton University, AOS Program <i>Sub-seasonal to seasonal (S2S) prediction of extreme climate events (e.g., atmospheric rivers and cold extremes) using GFDL SPEAR model</i>
Aug. 2015 – Aug. 2020	Graduate research assistant at University of Miami <i>Predicting the coming decades: decadal-scale climate variability, predictability and prediction</i>
Dec. 2012 - Jul. 2015	Student project leader at Institute of Ocean Sciences, Nanjing University <i>Climate variability, modeling and analysis of extremes in China</i>
Dec. 2013 - Dec. 2014	Research assistant at Chinese-Canadian Collaborative Isotope Laboratory <i>Reconstruction of atmospheric fallout of Cesium-137 in China and its environmental impacts</i>

## PUBLICATIONS

### Ongoing Activities (\* indicates corresponding author)

1. First or contributing author to several chapters in book under development, titled “*The predictability of Weather and the Earth’s System*”.
2. **Zhang, W.\***, Xiang, B., Kirtman, B., He J., Jia L., Delworth, T. (2022). The signal-to-noise paradox in the tropical Pacific. In preparation for *Nature Climate Change*.
3. **Zhang, W.\***, Xiang, B., Tseng, K., Johnson, N., Harris L., Delworth T. (2022). Subseasonal-to-seasonal prediction of wintertime atmospheric rivers in the GFDL SPEAR model. In preparation for *Journal of Climate*.
4. **Zhang, W.\*** & Toth, Z. (2022). An estimate of the limit of predictability. In Preparation for *Nonlinear Processes in Geophysics*.

### In Review

5. Yao, Y., **Zhang, W.\***, Wang, H., Zou, X., Wang C\*. (2022). Increasing impacts on summer extreme precipitation and atmospheric heatwaves in eastern China. *Climate Dynamics*. In review.

### Peer-Reviewed

1. Huang, Y., Sun, X., **Zhang, W.**, & Xiao, Z. (2022). Spatial distribution and migration of 239+ 240Pu in Chinese soils. *Science of The Total Environment*, 153724. <https://doi.org/10.1016/j.scitotenv.2022.153724>.
2. **Zhang, W.\***, Kirtman, B. Siqueira, L., Xiang, B., Infanti J., Perlin, N. (2021). Decadal Variability of Southeast US Rainfall in an Eddyng Global Coupled Model. *Geophysical Research Letters*. <https://doi.org/10.1029/2021GL096709>.
3. **Zhang, W.\***, Kirtman, B. Siqueira, L. Clement, A., Xia, J. (2021). Understanding the signal-to-noise paradox in

decadal climate predictability from CMIP5 and an eddy global coupled model. *Climate Dynamics*. <https://doi.org/10.1007/s00382-020-05621-8>.

4. Xia, J., **Zhang, W.**, Ferguson, A., Mena, K., Özgökmen, T., Solo-Gabriele, H.\* (2021). A novel method to evaluate chemical concentrations in muddy and sandy coastal regions before and after oil exposures. *Environmental Pollution*. <https://doi.org/10.1016/j.envpol.2020.116102>.
5. **Zhang, W.**, & Kirtman, B.\* (2019). Estimates of decadal climate predictability from an interactive ensemble model. *Geophysical Research Letters*. <https://doi.org/10.1029/2018GL081307>.  
*AGU Research Spotlights*. Featured in EOS Earth & Space Science News: Improving climate predictions over decades, Eos, 100, <https://doi.org/10.1029/2019EO125013>.
6. **Zhang, W.**, & Kirtman, B.\* (2019). Understanding the signal-to-noise paradox with a simple Markov model. *Geophysical Research Letters*. <https://doi.org/10.1029/2019GL085159>
7. Xia, J., **Zhang, W.**, Ferguson, A., Mena, K., Özgökmen, T., Solo-Gabriele, H.\* (2020). Use of chemical concentration changes in coastal sediments to compute oil exposure dates. *Environmental Pollution*, 113858. <https://doi.org/10.1016/j.envpol.2019.113858>.
8. Huang, Y., Pan, S.\*, **Zhang, W.**, Tims, S., Liu Z. (2018). The source and reference inventory of 239+240Pu in the soil of China. *China Environmental Science*. <https://doi.org/10.19674/j.cnki.issn1000-6923.2018.0519>.
9. Zhang, K., Pan, S.\*, Xu, Y., Cao, L., Xu, W., **Zhang, W.**, Hao, Y. (2016). Atmospheric Wet Deposition of Radionuclide Pu in the Changjiang River Estuary Region. *Scientia Geographica Sinica*. <https://doi.org/10.13249/j.cnki.sgs.2016.01.020>.
10. **Zhang, W.**, Pan, S.\*, Cao, L., Cai, X., Zhang, K., Xu, Y., Xu, W. (2015). Changes in extreme climate events in eastern China during 1960-2013: A case study of the Huaihe River Basin. *Quaternary International*. <https://doi.org/10.1016/j.quaint.2014.12.038>.
11. **Zhang W.**, Pan S.\*, Zhang K., Cao L., Zhao J. (2015). Study of the Cesium-137 Reference Inventory in the Mainland of China. *Acta Geographica Sinica*. <https://doi.org/10.11821/dlxb201509010>.
12. Zhang, K., Pan, S.\*, **Zhang, W.**, Xu, Y., Cao, L., Wang, Y., Zhao, Y. (2015). Influence on climate change on reference evapotranspiration and aridity index and their temporal-spatial variations in the Yellow River Basin, China from 1961 to 2012. *Quaternary International*. <https://doi.org/10.1016/j.quaint.2014.12.037>.
13. Xu W., Pan S.\*, Jia P., Yang X., Cao L., **Zhang W.**, Ruan X., Guan Y. (2015). <sup>137</sup>Cs Reference Inventory and its distribution in surface soil along the Fangchenggang coastal zone of Beibu Gulf. *Geographical Research*, 2015, 34(4): 655-665. <https://doi.org/10.11821/dlyj201504005>.
14. Wang, L., Cao, L.\*, Deng, X., Jia, P., **Zhang, W.**, Xu, X., Zhang K., Zhao Y., Yan B., Hu W., Chen Y. (2014). Changes in aridity index and reference evapotranspiration over the central and eastern Tibetan Plateau in China during 1960–2012. *Quaternary International*. <https://doi.org/10.1016/j.quaint.2014.07.030>.
15. Zhang, K., Pan, S.\*, Cao, L., Wang, Y., Zhao, Y., **Zhang, W.** (2014). Spatial distribution and temporal trends in precipitation extremes over the Hengduan Mountains region, China, from 1961 to 2012. *Quaternary International*. <https://doi.org/10.1016/j.quaint.2014.04.050>.
16. Cao L., Pan S.\*, Jia P., Zhuoma L., Zhao Y., Zhang K., **Zhang W.** (2014). Temporal and Spatial Characteristics of the Extreme Drought and Wet Events Changes in Hexi Area from 1960 to 2009. *Journal of Natural Resources*. <https://doi.org/10.11849/zrzyxb.2014.03.011>.

## PRESENTATIONS

- 2022 Sub-seasonal Prediction of Atmospheric Rivers in the GFDL SPEAR Model (Talk)  
*102nd AMS Annual Meeting, Houston, Texas, US*
- 2021 The Signal-to-Noise Paradox in Climate Models (Invited Talk)  
*US Climate Variability and Predictability (CLIVAR), Washington DC, US*
- 2021 Improve Climate Prediction from the Signal-to-Noise Paradox (Invited Talk)  
*Georgia Institute of Technology, Atlanta, Georgia, US*
- 2021 The Signal-to-Noise Paradox in Climate Simulations and Prediction (Invited Talk)  
*NOAA Global System Laboratory, Boulder, Colorado, US*
- 2021 Does the Signal-to-Noise Paradox Exist in Sub-seasonal Predictions? (Talk)  
*EGU Annual Meeting 2021, online.*
- 2020 Signal-to-noise Paradox in Climate Predictions (Invited Talk)  
*Princeton University/GFDL, Princeton, New Jersey, US*
- 2020 Internal Atmospheric Noise and Decadal Predictability of Surface Temperature, Precipitation and Extremes (Poster); Understanding the Signal-to-Noise Paradox in Climate Prediction (Talk)  
*100<sup>th</sup> AMS Annual Meeting, Boston, US*
- 2019 Advancing Decadal Climate Predictability in the North Atlantic (Talk)  
*WCRP ICRC-CORDEX International Conference on Regional Climate, Beijing, China*
- 2019 Estimates of Decadal Climate Predictability from an Interactive Ensemble Model (Poster)  
Ocean Eddies and Climate Predictability (Poster)  
*EGU Annual Meeting 2019, Vienna, Austria*
- 2019 Predicting the coming decades: a review and perspectives (Invited Talk)  
*Distinguished Chinese Young Scholars Forum, Nanjing, China*
- 2018 Decadal variability and predictability of the Indian Ocean with a coupled eddy-resolving climate model (Poster)  
*100<sup>th</sup> AGU Fall Meeting, Washington D.C, US*
- 2018 The Impact of Internal Atmospheric Dynamics on Decadal Climate Predictability (Talk)  
*JpGU Annual Meeting 2018, Chiba, Japan*
- 2018 Estimates of Decadal Climate Predictability in the Interactive Ensemble NCAR Model (Poster)  
*98th AMS Annual Meeting, Austin, US 2018*

## PROFESSIONAL DEVELOPMENT

- 2020 Summer school “Artificial Intelligence for Earth System Science (AI4ESS)”  
*NCAR, Boulder, US*
- 2019 Summer school "Fluid Dynamics of Sustainability and the Environment"  
*University of Cambridge (Cambridge, UK) and Ecole Polytechnique (Paris, France)*
- 2018 International Conference and Workshop on Subseasonal to Decadal Prediction  
*NCAR, Boulder, US*
- 2018 AMS Short Course to Using Python in Climate and Meteorology

98<sup>th</sup> AMS Annual Meeting, San Francisco, US

2017            Software Carpentry: Bash, Python and Java Programming Workshop  
                  Center for Computational Science, University of Miami, Miami, US

### AWARDS & SCHOLARSHIPS

2020            CIMES Postdoctoral Fellowship, Princeton University (AOS Program)  
2016 - present    Graduate Research Scholarship, University of Miami  
2015            Best Essay Award, Nanjing University  
2015            Excellent Graduate, Nanjing University  
2014 - 2015      National Fellowship, China Ministry of Education  
2014            Public Innovation Research Scholarship, Nanjing University  
2012 - 2013      Community Service and Leadership Award, Nanjing University

### TEACHING EXPERIENCE

2021            Assistant Lecturer, Princeton University  
                  Course: Collaborative Scientific Writing  
2021            Certified instructor, Udemy  
                  Invited online seminars: Climate Data Analysis and Visualization  
2018            Teaching Assistant, University of Miami  
                  Course: Atmospheric Dynamics II. Instructor: Prof. Ben Kirtman  
2017            Teaching Assistant, University of Miami  
                  Course: Cloud Physics and Radiative Transfer. Instructor: Prof. Paquita Zuidema  
2014            Lab Assistant, Nanjing University  
                  Course: Atmospheric Fallout and Soil Erosion. Instructor: Prof. Shaoming Pan

### PROFESSIONAL SERVICE

Ad-hoc reviewer for NSF proposals and journals: *Nature Climate Change*, *Geophysical Research Letters*, *Climate Dynamics*, and *Journal of Geophysical Research: Atmospheres*, etc.

2021 – present    National Postdoctoral Association Member  
2019 - present    European Geophysical Union Member  
2018 - present    American Meteorology Society Member  
                  Japan Geophysical Union Member  
2016 - present    AAAS/Science Member  
                  American Geophysical Union Member

### TECHNICAL STRENGTH

Coding Tools: Python (e.g., Pandas, Scikit-Learn, matplotlib, Xarray), MATLAB, Fortran, C/C++, Bash  
Software Packages and Data Visualization: ArcGIS, GrADS, R, NCL, CDO, NCO  
Numerical Models: CESM1/2, ECMWF, NCEP, GFDL, CMIP5/6  
Operating Systems: Linux/Unix, MacOS, Windows

---