Siyu Zhao

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CURRENT POSITION

Postdoctoral Researcher	University of Houston, TX, US	2023/06 – present
- Advisor: Dr. Honghai Zhang		

EDUCATION

Ph.D. Geosciences	University of Texas at Austin, TX, US	2018/08 – 2023/05
- Advisor: Dr. Kerry H. Cook		
M.S. Environmental Engineering	University of California at Berkeley, CA, US	2017/08 – 2018/05
B.E. Environmental (Honours)	Monash University, Melbourne, Australia	2015/07 – 2017/06
B.E. Environmental Engineering	Tongji University, Shanghai, China	2013/09 – 2017/06

PUBLICATIONS

1. Zhang, H., Xie, S.P., Seager, R., & **Zhao, S.,** Dynamical constraint on precipitation biases over the Indo-Pacific region during boreal summer in AMIP6 models. Geophysical Research Letters (2024). https://doi.org/10.1029/2023GL107181
2. **Zhao, S.,** Cook, K.H., & Vizy, E.K., Greenhouse gas-induced modification of intense storms over the West African Sahel through thermodynamic and dynamic processes. Climate Dynamics (2024). Accepted.
3. **Zhao, S.,** Cook, K.H., & Vizy, E.K., How shrinkage of Lake Chad affects the local climate. Climate Dynamics (2022). https://doi.org/10.1007/s00382-022-06597-3
4. **Zhao, S.,** & Cook, K.H., Influence of Walker circulations on East African rainfall. Climate Dynamics (2021). https://doi.org/10.1007/s00382-020-05579-7

PRESENTATIONS

Siyu Zhao, Kerry H Cook, & Edward K Vizy. Applications of Convective-Permitting Modeling over West Africa. The TCCS high-resolution modeling workshop, College Station, TX, 22-25 Jan 2023.	Oral
Siyu Zhao, Kerry H Cook, & Edward K Vizy. How Climate Change Modifies Intense Storms over West African Sahel through Thermodynamic and Dynamic Processes. Abstract 416821 accepted at the 103rd AMS Annual Meeting, Denver, Colorado, 8-12 Jan 2023.	Oral
Siyu Zhao, Kerry H Cook, & Edward K Vizy. How Shrinkage of Lake Chad Affects the Local Climate. Abstract 393953 presented at the 102nd AMS Annual Meeting, 23-27 Jan 2022.	Oral
Siyu Zhao, & Kerry H Cook. The Role of Overturning Zonal Circulations in Determining the Seasonality of East African Precipitation. Abstract 362699 presented at the 100th AMS Annual Meeting, Boston, MA, 12-16 Jan 2020.	Poster
Siyu Zhao, & Kerry H Cook. Influence of Walker circulations on East African rainfall, presented at the Water, Climate, and Environment seminar of Jackson School of Geosciences, University of Texas at Austin, 07 May 2021.	Oral

RESEARCH

Influence of local and remote moisture anomalies on Southwest U.S. summer droughts — 2023/06 - present

- Estimating the sources of moisture anomalies over Southwest U.S. using the Lagrangian moisture tracking analysis.
- Exploring the relationship between local/remote moisture anomalies and Southwest U.S. summer droughts.

Understanding the Intertropical Convergence Zone asymmetry — 2023/06 - present
- Developing ocean configurations for the NCAR CESM v2 climate model.

Greenhouse gas-induced modification of intense storms over the West African Sahel through thermodynamic and dynamic processes — 2022/01 – 2023/05
- Performed convective-permitting ensemble simulations over West African Sahel for the current and future climate using WRF and 'anomaly forcing' approach. Investigated the roles of vertical wind shear and thermodynamic processes in greenhouse gas-induced intensification of heavy rainfall over the Sahel.

How Shrinkage of Lake Chad Affects the Local Climate — 2020/07 – 2022/04
- Carried out convective-permitting ensemble simulations for small-lake, large-lake, and wetland scenarios over the Lake Chad region.
- Analysis of physical processes showed that afternoon rainfall is lower over the larger lake, associated with lower PBL, more stable atmosphere, and lake breezes.

Influence of Walker Circulations on East African Rainfall — 2019/01 – 2020/07
- Identified Walker circulations near East Africa using zonal streamfunctions and examined whether they form zonal modes of variability by correlation analysis.
- Analysis of column-integrated moisture and moist static energy budgets showed that lower (higher) East African short rains are related to stronger (weaker) Indian Ocean Walker Circulation through circulation and energy transport anomalies.

OTHER RESEARCH EXPERIENCES

Analysis of Atmospheric Energy Transport — 2018 Spring, UC Berkeley
- Analyzed diffusion coefficients for column-integrated moist static energy fluxes using ERA-Interim reanalysis.

Air Quality Modeling of Houston — 2018 Spring, UC Berkeley
- Performed air quality modeling with/without emissions over water bodies in Houston using WRF-Chem.

Investigating impacts of spatial variations on rainwater harvesting performance – using simulated data from Dance4Water for Melbourne — 2016 – 2017, Monash Univ.
- Analyzed the influence of environmental factors (e.g. distance from the city center) on rainwater saving efficiency using SQL and QGIS.

Antimicrobial Polymer Coating for Medical Devices — 2015 Summer, Monash Univ.
- Prepared safe work instructions and risk assessments. Carried out experiments of layer-by-layer coating and photo iniferter-mediated polymerization.

TEACHING

Guest lecturer, University of Houston — 2023 Fall
- Gave a guest lecture on "Future Projections and Extremes of Climate" for an undergraduate course "Introduction to Global Climate Change" of ~ 400 students.

Graduate Teaching Assistant, University of Texas at Austin — 2019, 2020 Spring
- Assisted with exam protocols, grading and TA office hours for an undergraduate course "Global Warming" of ~ 60 students.

OUTREACH

- Served as a judge for the 25th Robert E. Sheriff Student Posters at the Houston Geological Society evening meeting on Monday, November 13.
- Volunteered at the First Generation Student Mixer, Asian Pacific Islander Desi American Student Mixer, and Cultural Taste of Houston - 2023 Fall, at University of Houston.
- Member (2022/01 – 2023/05) of the editorial team for "Science, Y'all!" Blog (an official student blog of the Jackson School of Geosciences at UT Austin). Organized a blog that introduces the "JSG Around the World" seminar https://www.jsg.utexas.edu/science-yall/reflections-from-the-international-students-seminar/.

- Served as a judge for high school students at the 10th Annual Jackson School Student Research Symposium on 6th Mar 2021.
- Served as a mentor for PEAC Houston-wide High School Ideathon on 6th Feb 2021.
- Participated in one climate teach-in event on campus with several UT student groups and community-based groups on 28th Oct 2019.

SKILLS

Coding & Modeling	-	Proficient: Python, Matlab, GrADS, WRF
	-	Intermediate: FORTRAN, SQL, C#, Visual Basic
Other Software	-	Beginner: QGIS, AutoCAD

AWARDS & MEMBERSHIP

Summer Research Scholarship – Materials Science Engineering, Monash University	2015
First Prize Scholarship, Tongji University	2013, 2014
American Meteorological Society – Member	2019 – present