

Zhuonan Wang

Post Doctoral Fellow
Department of Environmental Sciences
Emory University



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Research Interest

Terrestrial ecosystem modeling, Coupled modeling of carbon-nutrients (N and P) in Terrestrial ecosystems, Nitrogen and phosphorus dynamics, Nutrients limitation and tropical forest ecology, Terrestrial-Aquatic Interface, GIS application in natural resources.

Teaching Interest

Introduction to Sustainability, Spatial Analysis in Natural Resources and Ecosystems, Spatial Ecosystem Modeling and Synthesis, Terrestrial Ecology/Ecosystem, Sustainable Agriculture

Research Skills

- Computer Programming: Proficient in R, C++.
- Remote sensing and GIS: Proficient in R, ArcGIS, NCL, and other programs in processing and analyzing spatial data
- Model development: developing Phosphorus module in spatially-explicit land ecosystem models (Dynamic Land Ecosystem Model)
- Model applications: tropical forest ecosystems at multiple scales from site to pan-tropics; Carbon and nutrient dynamics at the terrestrial-aquatic interface.
- Large dataset analysis: MODIS, LANDSAT, AVHRR, climate datasets (CMIP5), and Land ecosystem model inter-comparison datasets (MstMIP, ISI-MIP, and Trendy).

Education

- Ph.D. in Earth System Science with an emphasis on terrestrial ecosystem dynamics (2015 - present), School of Forestry and Wildlife Sciences, Auburn University, Auburn, AL, US. Major Professor: Dr. Hanqin Tian and Dr. Shufen Pan. Overall GPA: 3.76.
- MS in Nature Resource with an emphasis on Remote Sensing and Geospatial Analysis (2015 - 2019), School of Forestry and Wildlife Sciences, Auburn University, Auburn, AL, US. Major Professors: Dr. Shufen Pan. (Minor degree).
- MS in Aquaculture Ecology (2013 – 2015), College of Fisheries, Ocean University of China, Qingdao, China
- BS in Aquaculture (2009 - 2013), College of Fisheries, Ocean University of China, Qingdao, China

Current Employment

Post Doctoral Fellow, Department of Environmental Sciences Emory University (08/2021 - present)

Past Employment

- Graduate Research Assistant, Laboratory for GIS and Remote Sensing Applications, School of Forestry and Wildlife Sciences, Auburn University (8/2015 – 8/2021)
- Graduate Research Assistant, Ocean University of China (8/2013 – 8/2015)

Research Experience

- **Phosphorus limitation impact on tropical rainforests ecosystems** (2018 - present): Investigate the impact of phosphorus limitation constrains intact tropical rainforests responses to CO₂ fertilization effect by using the land ecosystem modeling.
- **Terrestrial ecosystem model development and improvement** (2015 – present): Improve model representations of phosphorus cycle on the platform of the Dynamic Land Ecosystem Model (DLEM).
- **Water, carbon, and phosphorus exports from river to coastal area** (2015 - present): Study the water, carbon, and phosphorus exports from river under the impacts of climate change, land use change and management, and CO₂ concentration increase.
- **The model intercomparison with rainfall manipulation experiments** (2018): Rainfall manipulation experiments as simulated by terrestrial biosphere models.

Teaching and Mentoring Experience

- Graduate Teaching Assistant for graduate laboratory, GIS Application in Natural Resources, Auburn University (Fall semester, 2016)

Professional Organization Membership

- American Geophysical Union (AGU) since 2016
- EGU member

Hobbies

Jogging/running, Cooking, Movie, basketball.

Peer-reviewed Publications

Published:

1. **Wang, Z.**, Tian, H., Yang, J., Shi, H., Pan, S., Yao, Y., et al. (2020). Coupling of phosphorus processes with carbon and nitrogen cycles in the dynamic land ecosystem model: Model structure, parameterization, and evaluation in tropical forests. *Journal of Advances in Modeling Earth Systems*, 12, e2020MS002123. <https://doi.org/10.1029/2020MS002123>
2. Paschalis, A., Fatichi, S., Zscheischler, J., Ciais, P., Bahn, M., Boysen, L., Chang, J., De Kauwe, M., Estiarte, M., Goll, D., Hanson, P. J., Harper, A. B., Hou, E., Kigel, J., Knapp, A. K., Larsen, K. S., Li, W., Lienert, S., Luo, Y., Meir, P., Nabel, J. E. M. S., Ogaya, R., Parolari, A. J., Peng, C., Peñuelas, J., Pongratz, J., Rambal, S., Schmidt, I. K., Shi, H., Sternberg, M., Tian, H., Tschumi, E., Ukkola, A., Vicca, S., Viovy, N., Wang, Y.-P., **Wang, Z.**, Williams, K., Wu, D., Zhu, Q. (2020). Rainfall manipulation experiments as simulated

- by terrestrial biosphere models: Where do we stand? *Global Change Biology*, 26(6), 3336-3355. doi:10.1111/gcb.15024
3. Gang, C., Pan, S., Tian, H., **Wang, Z.**, Xu, R., Bian, Z., Pan, N., Yao, Y., Shi, H. (2020). Satellite observations of forest resilience to hurricanes along the northern Gulf of Mexico. *Forest ecology and management*, 472, 118243. doi:<https://doi.org/10.1016/j.foreco.2020.118243>
 4. Chen, Y., Dong, S., **Wang, Z.**, Wang, F., Gao, Q., Tian, X., Xiong, Y. (2015). Variations in CO₂ fluxes from grass carp *Ctenopharyngodon Idella* aquaculture polyculture ponds. *Aquaculture Environment Interactions*, 8, 31-40. doi:10.2307/24864966

Wang, Z., Tian H., Yang, J., Shi H., Pan S. Phosphorus limit to the CO₂ fertilization effect in tropical rainforests as informed from a coupled biogeochemical model. *Global Change Biology* (submitted)

Bian, Z., Pan S, **Wang, Z.** Phosphorus loading and export from the Mississippi River Basin over the past century. *Water resources research*. (submitted)

Dong Xu, Guan C. Zhen, Tao Jiang, **Zhuonan Wang**, Ke Sun, Xiao Fan, Yan Zhang, Xiaowen Zhang, Yitao Wan, Haiyan Wu1, Zhi J. Tan, Nai H. Ye. Climate change increases neurotoxin of the harmful bloom diatom *Pseudo-nitzschia* globally. *Science Advance*.

In preparation:

Phosphorus limitation dampens the positive impacts of CO₂ fertilization on terrestrial ecosystem carbon and water cycles tropical rainforests in future

Presentations:

Zhuonan Wang, Hanqin Tian, Jia Yang, Shufen Pan, Phosphorus Limitation on CO₂ Fertilization Effect in the Terrestrial Ecosystems, AGU Fall meeting, New Orleans Ernest N. Morial Convention Center, New Orleans December 11-15, 2017.

Global Change and the Food, Energy, Water (FEW) Symposium (2018). Auburn AL. Coupling of Phosphorus Processes with Carbon and Nitrogen Cycles in the Dynamic Land Ecosystem Model: Model Structure, Parameterization and Evaluation in Tropical Forests.

Workshop on Coupled human-earth system for global sustainability (2019). Auburn AL.

North American Carbon Program 7th OPEN SCIENCE MEETING (2021) Online. Phosphorus limit to the CO₂ fertilization effect in tropical rainforests as informed from a coupled biogeochemical model.

Zhuonan Wang, Hanqin Tian, Shufen Pan, Hao Shi, Jia Yang, Latif Kalin, Christopher Anderson, and Naishen Liang, Phosphorus limit to the CO₂ fertilization effect in tropical rainforests as informed from a coupled biogeochemical model, EGU General Assembly, Online | 19–30 April 2021

Award:

China Scholarship Council Scholarship (2015)

International Graduate Student Award (2018) Auburn University

KyKenKee Fellowship (2020) Auburn University School of Forestry & Wildlife Sciences (The award is for forest sustainability, particularly in the areas of hardwood regeneration, management, and ecology)