

Yuan Sun

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Education

2023.07 – 2026.06 ◇ **Ph.D. Environmental Science, The University of Manchester, UK.**
Supervisors: Dr. Zhonghua Zheng, Prof. David Topping, and Prof. David Schultz

2020.09 – 2023.03 ◇ **M.A. (Hons) Architecture, Zhejiang University, China.**
First Class Honours
Supervisors: Prof. Zhu Wang

2015.09 – 2020.06 ◇ **B.A. (Hons) Architecture, Zhejiang University, China.**
2019.01–2019.05 (Exchange) National University of Singapore, Singapore
First Class Honours

Research Interest

- ◇ **Urban climate modeling and adaptation**
 - Cooling effects of white roof
 - Local climate zone
 - Anthropogenic heat
- ◇ **Multi-scale Earth system modeling and development**
By model scale:
 - Earth system model: Community Earth System Model (CESM)
 - Regional climate model: Weather Research & Forecasting Model (WRF)
By model component:
 - Atmosphere model: Community Atmosphere Model (CAM), CAM-Chem
 - Land surface model: Community Terrestrial System Model (CTSM)
 - Urban model: Community Land Model-Urban (CLMU), Noah Single-Layer Urban Canopy Model (Noah-SLUCM)

Research Publications

Earth system modeling

- 1 Sun, Y., Oleson, K. W., Zhao, L., Mills, G., He, C., Demuzere, M., Topping, D. O., Zhang, N., & Zheng, Z. (2025). Enhancing global-scale urban land cover representation using local climate zones in the Community Earth System Model. *Journal of Advances in Modeling Earth Systems*, 17(11), e2025MS004934. <https://doi.org/10.1029/2025MS004934>
- 2 Sun, Y., Fang, B., Oleson, K. W., Zhao, L., Topping, D. O., Schultz, D. M., & Zheng, Z. (2024). Improving urban climate adaptation modeling in the Community Earth System Model (CESM) through transient urban surface albedo representation. *Journal of Advances in Modeling Earth Systems*, 16(12), e2024MS004380. <https://doi.org/10.1029/2024MS004380>

Built environment

- 1 Sun, Y. (2025). Mapping urban morphological prototypes: Unveiling local identity in historic water towns of the Northern Zhejiang Plain, China. *Geocarto International*, 40(1), 2547011. <https://doi.org/10.1080/10106049.2025.2547011>

- 2 Sun, Y., Wu, Y., Yu, H., & Li, Y. (2025). County-level urban forms and their correlation with local governance in Jiande, China: Evidence from historical records. *Journal of Asia Architecture and Building Engineering*, 24(3), 1985–1998. <https://doi.org/10.1080/13467581.2024.2322000>
- 3 Sun, Y., Wu, Y., Yu, H., & Li, Y. (2024). Spatiotemporal evolution of urban landscapes in Chinese historic water towns (1918–2021). *Landscape Research*, 49(4), 568–583. <https://doi.org/10.1080/01426397.2024.2322138>

Others (Co-author)

- 1 Wang, Y., Zheng, Z., Sun, Y., Yao, Y., Ma, P.-L., Zhang, A., Zhu, S., Zhang, Z., ... Li, W. (2025). Improved representation of black carbon mixing structures suggests stronger direct radiative heating. <https://doi.org/10.1016/j.oneear.2025.101311>
- 2 Yu, J., Sun, Y., Lindley, S., Jay, C., Topping, D. O., Oleson, K. W., & Zheng, Z. (2025). Integration and execution of Community Land Model Urban (CLMU) in a containerized environment. <https://doi.org/10.1016/j.envsoft.2025.106391>
- 3 Xia, B., Wu, K., Guo, P., Sun, Y., Wu, J., Xu, J., & Wang, S. (2022). Multidisciplinary innovation adaptability of campus spatial organization: From a network perspective. <https://doi.org/10.1177/21582440221079929>
- 4 Zheng, Y., Sun, Y., Wang, Z., & Liang, F. (2022). Developing green-building design strategies in the Yangtze River Delta, China through a coupling relationship between geomorphology and climate. <https://doi.org/10.3390/land12010006>

Working Paper (Under Review)

- 1 Sun, Y., Lindley, S., & Zheng, Z. (2026). Linking urban population exposure to heatwaves with land cover change across the UK.
- 2 Sun, Y., Oleson, K. W., He, C., & Zheng, Z. (2025). Advancing CLMU for regional urban climate simulations through WRF coupling: Intercomparison with NOAH-SLUCM. <https://doi.org/10.31223/X5MT9P>
- 3 Sun, Y., Oleson, K. W., & Zheng, Z. (2025). Modeling urban traffic heat flux in the Community Earth System Model: Formulation and validation for two sites change across the UK. <https://doi.org/10.31223/X5ZX72>

Conferences & Talks

- 1 Enhancing global-scale urban land cover representation using local climate zones in the Community Earth System Model. (2026). Poster presentation at 106th AMS Annual Meeting (AMS26).
- 2 Enhancing global-scale urban land cover representation using local climate zones in the Community Earth System Model. (2025). Oral presentation at Land Model and Biogeochemistry Working Group Meeting 2025 of CESM 2025 Winter Working Group Meetings.
- 3 Improving urban climate adaptation modeling in the Community Earth System Model (CESM) through transient urban surface albedo representation. (2025). Oral presentation at 12th International Conference on Urban Climate (ICUC12).
- 4 Modeling urban traffic heat flux in the Community Earth System Model. (2025). Oral presentation at 30th Annual CESM Workshop.
- 5 Improving urban climate adaptation modelling in the Community Earth System Model (CESM) through transient urban surface albedo representation. (2024). Oral presentation at 29th Annual CESM Workshop.

6 *Urban representation based on local climate zones (LCZs) for the Community Earth System Model (CESM).* (2024). Poster presentation at 21st Annual Meeting Asia Oceania Geosciences Society (AOGS).

Teaching & Mentoring

Postgraduate student

2024–2025, 2023–2024 Spring & Summer ◊ **Graduate Teaching Assistant (GTA)**
Earth and Environmental Data Science

Undergraduate student

2025–2026 Fall & Winter ◊ **Graduate Teaching Assistant (GTA)**
Meteorology and Forecasting

2024–2025 Spring & Summer ◊ **Graduate Teaching Assistant (GTA)**
Natural Scientists Toolkit: Computer Programming

2024–2025, 2023–2024 Spring & Summer ◊ **Graduate Teaching Assistant (GTA)**
Geospatial Techniques

2025–2026, 2024–2025, 2023–2024 Fall & Winter ◊ **Graduate Teaching Assistant (GTA)**
Design 1 (Civil)

Secondary student

2024–2025, 2023–2024 Summer & Fall ◊ **Manchester Access Program (MAP) Tutor**

Academic Awards

2024 ◊ **Best Student Poster Award, Asia Oceania Geosciences Society (AOGS)**, awarded to poster presentation at the atmospheric sciences section.

Professional Qualification

2025 ◊ **Associate Fellow of Advance Higher Education (AFAHE)**, awarded by Advance HE.