

Yuan Sun



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esm-dev



YuanSun-UoM

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 NOAA-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.