# Dr. Hongwei Sun

## Contact Information

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## Education

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| Harvard University, | *Doctor of Philosophy (Environmental Science),* | 05/2023 |
| Tsinghua University, | *Master of Science (Atmospheric Science),* | 05/2018 |
| Sun Yat-Sen University, | *Bachelor of Science (Atmospheric Science),* | 05/2015 |

## Working Experiences

Department of Atmospheric Sciences, University of Hawaii

- 08/2025 till now: *Tenure-track assistant professor*
- 09/2024-07/2025: *Non-compensated faculty*

Department of Atmospheric Sciences, University of Washington

- 08/2023-08/2025: *Postdoc scholar*

Department of the Geophysical Sciences, University of Chicago

- 06/2023-08/2023: *Postdoc scholar*

## Research Interests

Small-scale aerosol-cloud interactions, marine cloud brightening.
Large-scale stratospheric dynamics and aerosols, stratospheric aerosol injection.
Coupled multiscale plume-in-grid model development.
Climate intervention and mitigation (renewable energies & environment).

## Publications *(* denotes students or postdocs supervised by Hongwei Sun)*

**Hongwei Sun**, Peter Blossey, Robert Wood, Ehsan Erfani, Sarah Doherty, Jeyun Chun. 2026. *Climate Warming Could Weaken Aerosol-Cloud Interactions in Subtropical Marine Stratocumulus*. npj Climate and Atmospheric Science.

**Hongwei Sun**, Stephen Bourguet, Lan Luan, David Keith. 2024. *Stratospheric transport and tropospheric sink of solar geoengineering aerosol: a Lagrangian analysis*. npj Climate and Atmospheric Science.

**Hongwei Sun**, Stephen Bourguet, Sebastian Eastham, David Keith. 2023. *Optimizing Injection Locations Relaxes Altitude-Lifetime Trade-Off for Stratospheric Aerosol Injection*. Geophysical Research Letters.

**Hongwei Sun**, Sebastian Eastham, David Keith. 2022. *Developing a Plume-in-Grid model for plume evolution in the stratosphere*. Journal of Advances in Modeling Earth Systems.

Jianbin Huang, Pengkang Lou, **Hongwei Sun**, Yong Luo, Zongci Zhao. 2019. *Numerical experimental study on the potential climatic impacts of large-scale wind farms in China*. Advances in Climate Change Research.

**Hongwei Sun**, Yong Luo, Zongci Zhao, Rui Chang. 2018. *The impacts of Chinese wind farms on climate*. Journal of Geophysical Research: Atmospheres.

**In review:**

Hanchang Ko* and **Hongwei Sun**. *Spatial and Temporal Variation of Stratospheric Turbulence Retrieved from High Vertical‐Resolution Radiosonde Observations*. Preprint.

**In Preparation (*** *denotes students or postdocs supervised by Hongwei Sun.*)**:**

**Hongwei Sun**, Amy Butler, Qiang Fu. *Stratospheric Dynamical Drivers of Particle Transport: Implications for Stratospheric Aerosol Injection.* In preparation.

**Hongwei Sun**, Mingyi Wang, Jian Wang. *Using Large-Eddy Simulations to Study How Marine Boundary Layer Clouds Response to Different Types of Aerosols*. In preparation.

## Conference Presentations

2026. *Aerosol-Cloud Interactions Weaken in a Warmer Climate*. 106th AMS Annual Meeting. Houston, USA. Oral.

2025. *Developing a Plume-in-Grid Model for Plume Evolution in the Stratosphere*. Virtual Workshop Series on Stratospheric Aerosol Injection (SAI). World Climate Research Program (WCRP). Oral (Recording).

2024. *A Lagrangian Analysis of Particle Transport in the Stratosphere: How QBO Modulates Stratosphere-to-Troposphere Flux (ST-Flux)?* AGU Fall Conference. Washington DC, USA. Poster.

2024. *How Aerosol-Cloud Interactions Respond to Climate Change in Large Eddy Simulations* Micro2Macro Workshop. Laramie (WY), USA. Poster.

2024. *Quantifying Stratospheric Particle Transport and Exploring Related Physical Drivers: A Lagrangian Analysis*. APARC Reanalysis Intercomparison (A-RIP) Workshop. Boulder, USA. Online oral.

2024. *Response of Aerosol-Cloud Interactions to Global Warming in Large Eddy Simulations*. CFMIP conference. Boston, USA. Poster.

2023. *Analyzing Zonal Asymmetry of Particle Transport in the Stratosphere: Is Injection Longitude Worth Considering for Stratospheric Aerosol Injection?* AGU Fall Conference. San Francisco, USA. Oral.

2022. *Investigating Particle Transport in the Stratosphere Based on Stratospheric Aerosol Injection*. SPARC (Stratosphere-troposphere Processes And their Role in Climate) conference. Colorado, USA. Poster.

2022. *Developing and Coupling a Lagrangian Plume Model into GEOS-Chem Model to Resolve Subgrid Plumes in the Stratosphere*. 10th International GEOS-Chem Conference. Saint Louis, USA. Oral.

2022. *Developing a Plume-in-Grid Model to Simulate Plume Evolution for Stratospheric Aerosol Injection*. Gordon Research Conference: Climate Engineering. Newry, USA. Poster.

2019. *Long-term Behavior of Stratospheric Aerosol Plumes in a Solar Geoengineering Scenario*. AGU Fall Conference. San Francisco, USA. Oral.

2017. *Regional climate model suggests upstream wind farms have weak but significant impacts on wind speed in Beijing during winter*. 4th International Conference Energy & Meteorology. Bari, Italy. Poster.

## Invited Talks and Seminars

2025. Seminar at Climate Systems Engineering Initiative. University of Chicago.
2025. *Seminar in Atmospheric Physics and Chemistry*. University of Washington.
2025. Seminar at Department of Earth System Science. Tsinghua University.
2024. Seminar at Department of Earth and Environmental Sciences. Chinese University of Hong Kong.
2024. *Atmospheric Sciences Special Seminar*. University of Hawaii.
2023. *Seminar in Atmospheric & Climate Dynamics*. University of Washington.
2023. *Reviewer 2 does Geoengineering podcast*. Available on Spotify and Apple Podcasts.
2023. *Solar Climate Intervention Virtual Symposia*. Online (Recording).
2023. Atmospheric Science & Engineering Laboratory, Washington University in St. Louis.
2023. *TAB Talks* (Tsinghua Alumni in Boston Talks). Online (Recoding in Chinese).
2022. *Graduate Student & Postdoc Seminar*. Harvard University.

## Teaching Experience

2026. Instructor: *ATMO 708 General Circulation of the Atmosphere*. Graduate-level course.
2024. Guest Lecturer: *Exploring Atmospheric and Climate Science*, University of Washington.
2023. Invited speaker for the Roundtable Discussion: *Teaching as an International Scholar* at Harvard Teaching Conference.
2022. *Certificate of Distinction in Teaching*, awarded by Harvard University.
2021. Teaching Fellowship: *Energy within Environmental Constraints*, Harvard University.
2020. Teaching Fellowship: *Introduction to Meteorology and Climate*, Harvard University.
2016. Teaching Fellowship: *Calculus I*, Tsinghua University.

## Mentoring Experiences

**I serve on the PhD dissertation committee for: Frederike Monte (U Hawaii); Elliott Fosler-Lussier (U Hawaii).**

**Han-Chang Ko**: Postdoc in my group at University of Hawaii.

- Han-Chang works with me on estimating stratospheric turbulence.

**Bingqing Zhang**: Postdoc co-hired by University of Chicago and University of Hawaii.

- Co-advised by Prof. Mingyi Wang (UChicago) and me.
- Working on developing a multi-scale plume-in-grid model.

**Sakura Takahashi:** Undergraduate at University of Hawaii at Manoa.

- Co-advised by Prof. Chuang Xu (Math Department, UHawaii) and me
- Senior undergraduate project: combining high-resolution observations and Lagrangian trajectory model to estimate stratospheric turbulence.

**Liam Schiffer**: Undergraduate at University of Wisconsin, Madison.

- I mentored Liam in the 2024 CICOES undergraduate intern program at University of Washington.
- Project: Using Data-Driven Methods to Estimate Cloud Radiative Effects.

## Professional Service

**Peer reviewer for:** Science Advances; Atmospheric Chemistry and Physics (ACP); Earth's Future; Geophysical Research Letters (GRL); Scientific Reports; Journal of Geophysical Research

(JGR): Atmospheres; Geoscientific Model Development (GMD); Wind Energy.

**Reviewer for National Science Foundation (NSF) grant proposals.**

**Curriculum Committee member (09/2025-now)**

- Department of Atmospheric Sciences, University of Hawaii at Manoa.
- Review courses, align program offerings with strategic goals, and gather and analyze student feedback.

**AMS session convener (2026)**

- *Aerosol-Earth System Interactions from Regional to Global Scale (18th Symposium on Aerosol-Cloud-Climate Interactions).*

**AGU session conveners (2024, 2025):**

- *Stratospheric Dynamics, Aerosol Processes, and the Interactions with the Troposphere*.
- *Boundary Layer Clouds and Climate Change*.

**2024 till now.** Secretary for Northwest Regional Chapter, Chinese-American Oceanic and Atmospheric Association (COAA-NWC).

**2024.** Judge of the National Collegiate Research Conference (2024) at Harvard University.