Dr. Hongwei Sun

Contact Information

Department of Atmospheric Sciences
University of Hawaii at Manoa
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Education

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

Large-scale stratospheric dynamics and aerosols, stratospheric aerosol injection.
Coupled multiscale plume-in-grid model development.
Small-scale aerosol-cloud interactions, marine cloud brightening.
Interactions between the environment and renewable energies.

Publications

H Sun, S Bourguet, L Luan, D Keith. 2024. *Stratospheric transport and tropospheric sink of solar geoengineering aerosol: a Lagrangian analysis*. npj Climate and Atmospheric Science.

H Sun, S Bourguet, S Eastham, D Keith. 2023. *Optimizing Injection Locations Relaxes Altitude-Lifetime Trade-Off for Stratospheric Aerosol Injection*. Geophysical Research Letters.

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

J Huang, P Lou, **H Sun**, Y Luo, ZC Zhao. 2019. *Numerical experimental study on the potential climatic impacts of large-scale wind farms in China*. Advances in Climate Change Research.

H Sun, Y Luo, Z Zhao, R Chang. 2018. *The impacts of Chinese wind farms on climate*. Journal of Geophysical Research: Atmospheres.

Submitted:

H Sun, P Blossey, R Wood, E Erfani, S Doherty, J Chun. *Using Large Eddy Simulations to Study How Climate Change Influences Aerosol-Cloud Interactions*. Under review in Science Advances. See preprint here.

In Preparation

H Sun and S Eastham. *Implementing Size-resolved Stratospheric Sulfate Aerosol in the GEOS-Chem Model to Simulate Pinatubo Volcano Eruption*. In preparation.

Z Hu and **H Sun**. *Using Convolutional Neural Network to Detect Aircraft Contrails Based on Satellite Images*. In preparation.

Conference Presentations

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

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

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

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

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

2022. AGU Fall Conference. Chicago, USA. "*Exploring Injection Locations for Stratospheric Aerosol Geoengineering to Maximize Particle Lifetime in the Stratosphere*". Poster.

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

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

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

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

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

Invited Talks and Seminars

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 and Mentoring Experiences

2024. Guest Lecturer: *Exploring Atmospheric and Climate Science*, University of Washington.

2024. Mentor in the CICOES undergraduate intern program at University of Washington.

- Student: Liam Schiffer (Undergraduate from University of Wisconsin, Madison).
- Project: Using Data-Driven Methods to Estimate Cloud Radiative Effects.

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.

Professional Service

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

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*.

2024-2025. 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.

Research grants

2024-2027: Modeling Atmospheric Turbulence and Its Impacts on Plume Dispersion for Stratospheric Aerosol Injection.

2025-2028: Towards a practical understanding of stratospheric aerosol geoengineering.

2025-2028: Constraining aerosol size distribution in the aircraft wake for quantitative stratospheric aerosol injection.