

Wu Sun

CONTACT INFORMATION

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Department of Global Ecology
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RESEARCH INTERESTS

Atmosphere Biosphere–atmosphere exchange of carbon, water, and trace gases
Plants Photosynthesis, chlorophyll fluorescence, and stomatal conductance
Soils Multiphase reactive transport of trace gases
Data Science Applications of statistical learning in biogeosciences

EDUCATION

Ph.D. in Atmospheric and Oceanic Sciences Sep 2012 – Sep 2017
University of California, Los Angeles (UCLA) Los Angeles, CA
Carbonyl sulfide exchange between soils and the atmosphere: Observations and modeling
Advisor: [Dr. Ulli Seibt](#)

B.Sc. in Geology Sep 2008 – Jun 2012
Nanjing University Nanjing, China

ACADEMIC APPOINTMENTS

Postdoctoral Research Associate Apr 2019 – present
Department of Global Ecology, Carnegie Institution for Science Stanford, CA

Postdoctoral Scholar Oct 2017 – Apr 2019
Department of Atmospheric and Oceanic Sciences, UCLA Los Angeles, CA

Graduate Student Researcher Jul 2013 – Sep 2017
Department of Atmospheric and Oceanic Sciences, UCLA Los Angeles, CA

AWARDS AND FELLOWSHIPS

Bjerknes Award, UCLA Department of Atmospheric and Oceanic Sciences 2017

University of California ISEECI Graduate Student Fellowship 2016 – 2017

Participant Award to attend the IsoCamp Course, University of Utah 2014

Run Tian LLC Scholarship, Nanjing University 2012

Undergraduate Innovative Research Grant, Nanjing University 2010 – 2011

Ren Min Scholarship (1st tier), Nanjing University 2010

Ren Min Scholarship (2nd tier), Nanjing University 2009

REFEREED JOURNAL PUBLICATIONS

[1] Sun, W., Fang, Y., Luo, X., Shiga, Y. P., Zhang, Y., Andrews, A. E., Thoning, K. W., Fisher, J. B., Keenan, T. F. & Michalak, A. M. [Midwest US Croplands Determine Model Divergence in North American Carbon Fluxes](#). *AGU Advances* **2**, e2020AV000310 (2021).

[2] Bond-Lamberty, B. *et al.* [COSORE: A community database for continuous soil respiration and other soil-atmosphere greenhouse gas flux data](#). *Global Change Biology* **26**, 7268–7283 (2020).

[3] Kohonen, K.-M., Kolari, P., Kooijmans, L. M. J., Chen, H., Seibt, U., Sun, W. & Mammarella, I. [Towards standardized processing of eddy covariance flux measurements of carbonyl sulfide](#). *Atmospheric Measurement Techniques* **13**, 3957–3975 (2020).

[4] Pezner, A. K., Pivovarov, A. L., Sun, W., Sharifi, M. R., Rundel, P. W. & Seibt, U. [Plant Functional Traits Predict the Drought Response of Native California Plant Species](#). *International Journal of Plant Sciences* **181**, 256–265 (2020).

- [5] Kooijmans, L. M. J., Sun, W., Aalto, J., Erkkilä, K.-M., Maseyk, K., Seibt, U., Vesala, T., Mammarella, I. & Chen, H. [Influences of light and humidity on carbonyl sulfide-based estimates of photosynthesis](#). *Proceedings of the National Academy of Sciences* **116**, 2470–2475 (2019).
- [6] Ranasinghe, D., Lee, E. S., Zhu, Y., Frausto-Vicencio, I., Choi, W., Sun, W., Mara, S., Seibt, U. & Paulson, S. E. [Effectiveness of vegetation and sound wall-vegetation combination barriers on pollution dispersion from freeways under early morning conditions](#). *Science of The Total Environment* **658**, 1549–1558 (2019).
- [7] Sun, W., Kooijmans, L. M. J., Maseyk, K., Chen, H., Mammarella, I., Vesala, T., Levula, J., Keskinen, H. & Seibt, U. [Soil fluxes of carbonyl sulfide \(COS\), carbon monoxide, and carbon dioxide in a boreal forest in southern Finland](#). *Atmospheric Chemistry and Physics* **18**, 1363–1378 (2018).
- [8] Sun, W., Maseyk, K., Lett, C. & Seibt, U. [Stomatal control of leaf fluxes of carbonyl sulfide and CO₂ in a *Typha* freshwater marsh](#). *Biogeosciences* **15**, 3277–3291 (2018).
- [9] Whelan, M. E. *et al.* [Reviews and syntheses: Carbonyl sulfide as a multi-scale tracer for carbon and water cycles](#). *Biogeosciences* **15**, 3625–3657 (2018).
- [10] Kooijmans, L. M. J., Maseyk, K., Seibt, U., Sun, W., Vesala, T., Mammarella, I., Kolari, P., Aalto, J., Franchin, A., Vecchi, R., Valli, G. & Chen, H. [Canopy uptake dominates nighttime carbonyl sulfide fluxes in a boreal forest](#). *Atmospheric Chemistry and Physics* **17**, 11453–11465 (2017).
- [11] Sun, W., Maseyk, K., Lett, C. & Seibt, U. [Litter dominates surface fluxes of carbonyl sulfide in a Californian oak woodland](#). *Journal of Geophysical Research: Biogeosciences* **121**, 438–450 (2016).
- [12] Sun, W., Maseyk, K., Lett, C. & Seibt, U. [A soil diffusion–reaction model for surface COS flux: COSSM v1](#). *Geoscientific Model Development* **8**, 3055–3070 (2015).

CONFERENCE
PRESENTATIONS

- [1] Sun, W., Fang, Y., Luo, X., Shiga, Y. P., Zhang, Y., Andrews, A. E., Thoning, K. W., Fisher, J. B., Keenan, T. F. & Michalak, A. M. “Midwest U.S. croplands determine model divergence in North American carbon fluxes”. [poster]. North American Carbon Program 7th Open Science Meeting. Online, 2021.
- [2] Sun, W., Fang, Y., Luo, X., Shiga, Y. P., Zhang, Y., Andrews, A. E., Thoning, K. W., Fisher, J. B., Keenan, T. F. & Michalak, A. M. “Midwest U.S. croplands determine model divergence in North American carbon fluxes”. [talk]. GML Virtual Global Monitoring Annual Conference (eGMAC). Online, 2021.
- [3] Seibt, U., Sun, W. & Maseyk, K. “Canopy gradients in fluxes of carbonyl sulfide and CO₂ in a tropical rainforest”. [lightning talk]. American Geophysical Union Fall Meeting. Online, 2020.
- [4] Sun, W., Fang, Y., Luo, X., Shiga, Y. P., Zhang, Y., Andrews, A. E., Thoning, K. W., Fisher, J. B., Keenan, T. F. & Michalak, A. M. “Midwest US croplands determine model divergence in North American carbon fluxes”. [talk]. American Geophysical Union Fall Meeting. Online, 2020.
- [5] Sun, W. “Benchmarking North American photosynthesis using atmospheric observations”. [lightning talk]. Carnegie at Stanford Postdoc and Student Symposium. Stanford, CA, USA, 2019.

- [6] Sun, W., Kooijmans, L. M. J., Maseyk, K., Aalto, J., Kukka-Maaria, E., Mammarella, I., Pihlatie, M., Vesala, T., Chen, H. & Seibt, U. “Understanding environmental and physiological controls of the leaf COS : CO₂ uptake relationship for better photosynthesis estimates”. [poster]. American Geophysical Union Fall Meeting. Washington D.C., USA, 2018.
- [7] Sun, W., Maseyk, K., Lett, C. & Seibt, U. “Soil–atmosphere exchange of carbonyl sulfide in an oak woodland (Stunt Ranch)”. [talk]. ISEECI Research Symposium. University of California Sedgwick Reserve, Santa Ynez, CA, USA, 2017.
- [8] Sun, W., Maseyk, K., Lett, C. & Seibt, U. “The influence of vapor pressure deficit on the use of carbonyl sulfide as a photosynthetic tracer”. [poster]. American Geophysical Union Fall Meeting. New Orleans, LA, USA, 2017.
- [9] Sun, W. & Seibt, U. “Leaf relative uptake ratio – A theoretical approach”. [lightning talk]. Keck Institute for Space Studies, California Institute of Technology, Pasadena, CA, USA, 2017.
- [10] Sun, W., Maseyk, K., Lett, C. & Seibt, U. “A reactive-transport model for soil carbonyl sulfide flux”. [talk]. Workshop on the Biosphere–Atmosphere Exchange and Global Budget of Carbonyl Sulfide. University of Helsinki Hyytiälä Forestry Field Station, Finland, 2016.
- [11] Sun, W., Maseyk, K., Lett, C., Pesqueira, A. & Seibt, U. “Comparing the carbonyl sulfide (COS) method with two carbon flux based methods of flux partitioning at a freshwater marsh”. [poster]. American Geophysical Union Fall Meeting. San Francisco, CA, USA, 2016.
- [12] Sun, W., Maseyk, K., Lett, C., Juarez, S., Kooijmans, L. M. J., Mammarella, I., Vesala, T., Chen, H. & Seibt, U. “Soil carbonyl sulfide (COS) fluxes across four distinct ecosystems”. [poster]. American Geophysical Union Fall Meeting. San Francisco, CA, USA, 2015.
- [13] Seibt, U., Sun, W., Juarez, S., Maseyk, K. & Lett, C. “Physical and biological processes interact to determine soil carbonyl sulfide (COS) uptake in two contrasting ecosystems”. [poster]. The Complex Soil Systems Conference, Berkeley, CA, USA. 2014.
- [14] Sun, W., Juarez, S., Maseyk, K., Lett, C. & Seibt, U. “Soil–atmosphere carbonyl sulfide exchange in a tropical rainforest at La Selva, Costa Rica”. [poster]. American Geophysical Union Fall Meeting. San Francisco, CA, USA, 2014.
- [15] Sun, W., Maseyk, K., Lett, C. & Seibt, U. “Soil and litter carbonyl sulfide fluxes in an oak woodland in California”. [talk]. ASA, CSSA, & SSSA International Annual Meeting. Long Beach, CA, USA, 2014.
- [16] Sun, W., Maseyk, K., Lett, C. & Seibt, U. “Soil carbonyl sulfide fluxes in a Mediterranean ecosystem: Insights from model–data fusion analysis”. [poster]. American Geophysical Union Fall Meeting. San Francisco, CA, USA, 2013.

INVITED TALKS

- Understanding model divergence in North American biospheric carbon fluxes using atmospheric CO₂ observations*
Carbon Club Seminar, NASA Jet Propulsion Laboratory 25 Feb 2021
- Understanding canopy processes of carbonyl sulfide (COS) exchange for accurate estimates of photosynthesis*
Climate & Ecosystem Sciences Division, Lawrence Berkeley National Lab 29 Jul 2019
- Understanding canopy processes of carbonyl sulfide (COS) exchange for accurate photosynthesis estimates*

	Department of Global Ecology, Carnegie Institution for Science	31 Jan 2019
	<i>Soil carbonyl sulfide flux in an oak woodland: observations and modeling</i>	
	Green Ocean Amazon (GOAmazon) Ecophysiology Project Meeting (telecon)	27 Oct 2014
INTERNAL TALKS	<i>Midwest U.S. croplands determine model divergence in North American carbon fluxes</i>	
	Department of Global Ecology, Carnegie Institution for Science	8 Dec 2020
	<i>Understanding soil flux of carbonyl sulfide for better estimates of terrestrial photosynthesis</i>	
	Department of Atmospheric and Oceanic Sciences, UCLA	17 May 2017
	<i>Atmospheric oxygen isotope signature as a tracer for global oxygen cycle: A box model study of the past four glacial cycles</i>	
	Department of Atmospheric and Oceanic Sciences, UCLA	19 Nov 2012
TEACHING AND MENTORING	Department of Global Ecology, Carnegie Institution for Science	
	Field Mentor, NSF Research Experience for Undergraduates (REU) Program	Jun 2019
	La Selva Biological Station, Costa Rica	
	Department of Atmospheric and Oceanic Sciences, UCLA	
	<i>Mentored</i>	
	Noah Sonnenberg, undergraduate student in Seibt lab	Mar – Apr 2019
	Antoine Kunsch, professional doctorate student, UCLA Institute of the Environment and Sustainability	Jul 2017 – Jun 2018
	Alejandra Pesqueira, undergraduate student in Seibt lab	2015 – 2017
	<i>Teaching Assistant (Teaching Associate since 2016)</i>	
	Atmospheric and Oceanic Sciences Laboratory (AOS 150)	Fall 2016
	Climate Change – From Puzzles to Policy (AOS 1)	Winter 2015
	Fundamentals of Air and Water Pollution (AOS 104)	Fall 2014
	<i>Guest Lecturer</i>	
	<i>Python data analysis</i>	Winter 2017
	Introduction to Ecosystem–Atmosphere Interactions (AOS 155)	
	<i>Regression and optimization with SciPy</i>	Spring 2016
	Python Data Analysis (AOS 281)	
	<i>Python data analysis</i>	Fall 2015
	Atmospheric and Oceanic Sciences Laboratory (AOS 150)	
	<i>Soil chamber demo</i>	Spring 2015
	Introduction to Ecosystem–Atmosphere Interactions (AOS 155)	
PROFESSIONAL SERVICE	Reviewed manuscripts for	
	<ul style="list-style-type: none"> • <i>Nature Plants</i> • <i>Geophysical Research Letters</i> • <i>Journal of Geophysical Research: Biogeosciences</i> • <i>Geoscientific Model Development</i> • <i>Biogeosciences</i> 	<ul style="list-style-type: none"> • <i>Atmospheric Measurement Techniques</i> • <i>SOIL (EGU)</i> • <i>Oecologia</i> • <i>Biogeochemistry</i> • <i>Frontiers in Forests and Global Change</i>

Reviewed grant proposal for Austrian Science Fund (FWF)

Professional Memberships

- American Geophysical Union, since 2012
- European Geosciences Union, 2015 – 2016, 2018 – 2019

Departmental Service

Member, Committee for Diversity, Equity, and Inclusion 2020 – present
Department of Global Ecology, Carnegie Institution for Science

Graduate Student Member, Computing Committee 2016 – 2017
Department of Atmospheric and Oceanic Sciences, UCLA

Member, XEII UCLA Chapter 2012 – 2017

OUTREACH **Exhibitor**, UCLA “Exploring Your Universe” (held annually in November) 2014 – 2018

Poster presenter, UCLA Organization for Cultural Diversity in Science (OCDS) Fall Science Showcase Oct 2017

Exhibitor at UCLA AOS Kiosk, The 4th S.T.E.A.M. Nation event Oct 2015

PROFESSIONAL TRAINING COURSES AND WORKSHOPS A Crash Course in Causality: Inferring Causal Effects from Observational Data by University of Pennsylvania on Coursera Sep 2020
Certificate no. [6L6QUKXSZQNV](#)

Programming Languages Part B by University of Washington on Coursera Sep 2018
Certificate no. [UPPRMK6BQHGX](#)

High Performance Programming: Back to the Hardware May 2018
UCLA Institute for Digital Research and Education, Los Angeles, CA, USA

Programming Languages Part A by University of Washington on Coursera Apr 2018
Certificate no. [JQ3CPB96FRL8](#)

Next-Generation Approach for Detecting Climate–Carbon Feedbacks: Space-Based Integration of Carbonyl Sulfide (OCS), CO₂, and Solar Induced Fluorescence (SIF) Sep 2017
Keck Institute for Space Studies, Caltech, Pasadena, CA, USA

Machine Learning by Stanford University on Coursera Sep 2017
Certificate no. [U4WQ9YWG68C2](#)

Applications of Remote Sensing to Soil Moisture and Evapotranspiration Sep 2016
NASA Applied Remote Sensing Training (ARSET) Program (online)

Biosphere–Atmosphere Exchange and Global Budget of Carbonyl Sulfide Sep 2016
Hyytiälä Forestry Field Station, University of Helsinki, Finland

[Stable Isotope Biogeochemistry and Ecology \(IsoCamp\)](#) Jun 2014
University of Utah, Salt Lake City, UT, USA

[The 6th Annual Flux Course](#) Jul 2013
University of Colorado Mountain Research Station, Niwot Ridge, CO, USA

FIELDWORK EXPERIENCE La Selva Biological Station, Costa Rica Jun 2019

Vegetation characterization along I-10, US-101, and CA-99 freeways Oct – Dec 2016

San Joaquin Freshwater Marsh, Irvine, CA Jul – Oct 2016

La Selva Biological Station, Costa Rica

Oct 2013

San Joaquin Freshwater Marsh, Irvine, CA

May – July 2013

Stunt Ranch Natural Reserve, Santa Monica Mountains, CA

Mar – May 2013

FIELD AND
LABORATORY
SKILLS

- Biometeorology: Eddy covariance, infrared gas analyzer, meteorological sensors
- Plants: Portable photosynthesis system, chlorophyll fluorescence, leaf chamber
- Soils: Soil respiration chamber, soil sensors

PROGRAMMING
SKILLS

proficient in

- Python: core scientific stack, data visualization, machine learning, parallel computing, C and Fortran interfacing, package development, Jupyter Notebook
- R: ggplot2, tidyverse, RMarkdown
- Unix/Linux: Bash scripting, high-performance computing environment
- Version control: Git, GitHub

some experience with

- Languages: C, Fortran, Julia, MATLAB, IDL, OCaml, Haskell
- Documentation: Sphinx, Doxygen
- Testing: PyTest, Travis CI
- Website building: Hugo, Jekyll

REFERENCES

References are available upon request.

(* Updated on May 24, 2021 *)