

Sophia I. Macarewich

Earth and Planetary Sciences
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EDUCATION

2016–2021	Univ. of Michigan, Ann Arbor	Earth and Environmental Sciences Ph.D. Certificate in Computational Discovery and Engineering	GPA: 3.84
2012–2016	Univ. of California, Santa Barbara	Physical Geography B.S. Environmental Studies B.S.	GPA: 3.68

HONORS & AWARDS

2022	National Science Foundation Atmospheric & Geospace Sciences Postdoctoral Research Fellowship University of California, Davis
2018	Michigan Institute for Computational Discovery & Engineering (MICDE) Fellowship Honorable Mention University of Michigan, MICDE
2016	Rackham Merit Fellowship University of Michigan, Rackham Graduate School

PUBLICATIONS

Chen, J., Montañez, I.P., Zhang, S., Isson, T.T., **Macarewich, S.I.**, Planavsky, N.J., Zhang, F., Rauzi, S., Daviau, K., Yao, L., Qi, Y., Wang, Y., Poulsen, C.J., Fan, J., Anbar, A., Shen, S. Wang, X. (2022). Marine anoxia linked to abrupt global warming during Earth's penultimate icehouse. *Proceedings of the National Academy of Sciences*. DOI: <https://doi.org/10.1073/pnas.2115231119>

Macarewich, S.I., Poulsen, C.J., and Montañez, I.P. (2021). Simulation of oxygen isotopes and circulation in a late Carboniferous epicontinental sea with implications for proxy records. *Earth and Planetary Science Letters*. 559, 116770. DOI: <https://doi.org/10.1016/j.epsl.2021.116770>

Matthaeus, W.J., **Macarewich, S.I.**, Richey, J.D., Wilson, J.P., McElwain, J.C., Montañez, I.P., DiMichele, W.A., Hren, M.T., Poulsen, C.J., White, J.D. (2021). Freeze tolerance influenced forest cover and hydrology during the Pennsylvanian. *Proceedings of the National Academy of Sciences*. DOI: <https://doi.org/10.1073/pnas.2025227118>

White, J.D., Montañez, I.P., Wilson, J.P., Poulsen, C.J., McElwain, J.C., DiMichele, W.A., Hren, M.T., **Macarewich, S.I.**, Richey, J., Matthaeus, W.J. (2020). Paleo-BGC to Simulate the Dynamic Response of Late Pennsylvanian Plants to Elevated O₂ And Aridification. *American Journal of Science*. 320, 547–598. DOI: <https://doi.org/10.2475/09.2020.01>

Richey, J.D., Montañez, I.P., White, J.D., DiMichele, W.A., Matthaeus, W.J., Poulsen, C.J., **Macarewich, S.I.**, Looy, C.V. (2020). Modeled physiological mechanisms for observed changes in the late Paleozoic plant fossil record. *Palaeogeography, Palaeoclimatology, Palaeoecology*. DOI: <https://doi.org/10.1016/j.palaeo.2020.110056>

Macarewich, S.I. and Poulsen, C.J. (2022, [in revision](#)). Glacial-interglacial controls on ocean circulation and temperature during the Permo-Carboniferous. *Paleoceanography and Paleoclimatology*.

Macarewich, S.I., Poulsen, C.J., Matthaeus, W.J., Richey, J.D., White, J.D., Montañez, I.P., DiMichele, W.A., Hren, M.T., McElwain, J.C., Wilson, J.P. (2022, in preparation). Ecosystem-to-global scale modeling of vegetation-climate feedbacks during the Late Paleozoic Ice Age with fossil-based plant functional types.

RESEARCH EXPERIENCE

University of California, Davis

Earth and Planetary Sciences Dept., Postdoctoral Researcher (Feb 2022 – present). PI: Dr. Isabel Montañez

- Global climate modeling of the hydroclimate response of the southwestern US to past and future AMOC weakening.

University of Michigan, Ann Arbor

Climate Change Research, Graduate Student (Sep 2016 – Dec 2021). PI: Dr. Chris Poulsen

- Global climate modeling of the Late Paleozoic Ice Age to investigate glacial-interglacial changes in ocean dynamics and tropical climate-vegetation interactions.

University of California, Santa Barbara

Earth Research Institute, Research Assistant (Jun 2015 – Jun 2016). PI: Dr. Carter Ohlmann

- Analysis of wind-driven cross-shelf ocean circulation in the Santa Barbara Channel to link near-shore kelp forest dynamics to sandy beach ecosystems.

Climate Variations and Change, Research Assistant (Sep 2014 – Feb 2015). PI: Dr. Leila Carvalho

- Analysis of the long-term frequency and intensity of extreme foehn winds, locally known in Santa Barbara as “Sundowner” winds, in collaboration with the National Weather Service in Oxnard, CA.

TEACHING EXPERIENCE

Guest Lecturer, *Climate Meetings* with Dr. Leila Carvalho, Earth Research Institute—University of California, Santa Barbara (Winter 2022).

Guest Lecturer, *Deep-time Paleoclimates* with Dr. James Zachos, Department of Earth and Planetary Sciences—University of California, Santa Cruz (Winter 2020).

Graduate Student Instructor, *Introduction to Environmental Science in the Rockies*, Department of Earth and Environmental Science—Camp Davis, University of Michigan (Summer 2017 & Summer 2018).

PRESENTATIONS

Research Talks

earth2earth: UK-wide geoscience seminar series (April 2021)—Virtual: *Reconstructing a deep time Earth system: The penultimate ice house* with Dr. Isabel Montañez

National Center for Atmospheric Research (NCAR) Paleoclimate Working Group (February 2021)—Virtual: *Ocean deoxygenation linked to abrupt global warming during the Earth’s penultimate icehouse*

American Geophysical Union Fall Meeting (December 2020)—Virtual: *Ecosystem-to-global scale modeling of vegetation-climate feedbacks during the Late Paleozoic Ice Age*

CLIVAR Water Isotopes and Climate Workshop (October 2019)—Boulder, CO: *Controls on Permo-Carboniferous tropical climate in Pangaea: Insights from iCESM*

Community Earth System Model Workshop (June 2019)—Boulder, CO: *A new method for constraining seawater conditions in ancient epicontinental seas, with implications for oxygen isotope secular curves*

European Geophysical Union (April 2019)—Vienna, Austria: *Decoupling of ancient epicontinental sea and open ocean $\delta^{18}\text{O}$ in an isotope-enabled Earth system model*

NCAR Paleoclimate Working Group (February 2019)—Boulder, CO: *Decoupling of Late Paleozoic epicontinental sea and open ocean $\delta^{18}\text{O}$ in iCESM*

Research Posters

American Geophysical Union Fall Meeting (December 2021)—New Orleans, LA: *Global Climate Simulations of Glacial-Interglacial Ocean Circulation and Temperature During the Permo-Carboniferous*

American Geophysical Union Fall Meeting (December 2019)—San Francisco, CA: *A Model-Based Evaluation of Permo-Carboniferous Climate Change in Tropical Pangaea*

Michigan Geophysical Union (April 2019)—Ann Arbor, MI: *Decoupling of Late Paleozoic epicontinental sea and open ocean $\delta^{18}\text{O}$ in an isotope-enabled Earth system model*

American Geophysical Union Fall Meeting (December 2018)—Washington D.C.: *Decoupling of Late Paleozoic epicontinental sea and open ocean $\delta^{18}\text{O}$ in a fully coupled isotope-enabled Earth system model*

WORK EXPERIENCE

Parasite Ecology Group, UC Santa Barbara. Laboratory Assistant (Dec 2014 – Jun 2016)

- Maintained breeding and parasite-infected populations of *Potamopyrgus antipodarum*. Also, sorted and identified various parasites and food content in rodent gut samples.

Marine Science Institute, UC Santa Barbara. Abalone Aquarist (Mar 2013 – Feb 2015)

- Maintained populations of abalone (*Haliotis cracherodii* and *H. sorenseni*), while participating in white abalone spawning attempts for the NOAA fisheries White Abalone Recovery Plan.
- Developed and taught Marine Ecology and Biology curriculum to grades K-12.

PROGRAMMING EXPERIENCE

Matlab, NCAR Command Language, Fortran, Python

CLIMATE MODELING EXPERIENCE

NCAR Community Earth System Model (CESM), GENESIS Global Climate Model

LEADERSHIP, OUTREACH, and MENTORSHIP

Graduate Modules on Mental Health

- Developed course modules on the imposter phenomenon and mental health for the first-year graduate seminar in the Earth & Environmental Sciences at Univ. of Michigan, October-November 2020.

Meditation and Mindfulness CommuniTEA

- Organize and lead biweekly meetings on meditation and mindfulness to advocate for mental wellness amongst early career scientists in the Earth & Environmental Sciences at Univ. of Michigan, February-December 2020.

Dana Hills High School Marine Ecology Field Course

- Taught high school students from Dana Point, CA about marine ecology field concepts in Baja California, May 2019.

University of Michigan Earth Camp

- Taught students from Detroit-area high schools meteorology concepts and facilitated a high-altitude weather balloon launches in Ypsilanti, MI and Jackson Hole, WY, June-July 2017.

Great Lakes National Ocean Sciences Bowl

- Served as a moderator for an academic competition where teams of high school students are tested on ocean and Great Lakes knowledge at the Univ. of Michigan, February 2017.

UC Academic Advising Conference

- Presented a talk on my undergraduate research to academic advisors from all University of California institutions, May 2016.

SERVICE

Session Convener, *Phanerozoic climate through space and time: Approaches, advances, and challenges in reconstructing the evolution of Earth's climate*, American Geophysical Union Fall Meeting (Fall 2021).

Reviewer for *Palaeogeography*, *Palaeoclimatology*, *Palaeoecology*, *Geophysical Research Letters*, *Paleoceanography* and *Paleoclimatology*, and *Proceedings of the National Academy of Sciences*