

Sophia I. Macarewich

Earth and Environmental 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

2021	National Science Foundation Atmospheric & Geospace Sciences Postdoctoral Research Fellowship
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

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>

Chen, J., Montañez, I.P., Zhang, S., Isson, T.T., **Macarewich, S.I.**, Planavsky, N.J., Zhang, F., Yao, L., Qi, Y., Wang, Y., Poulsen, C.J., Fan, J., Anbar, A., Shen, S. Wang, X. (2021, in revision). Marine anoxia linked to abrupt global warming during Earth's penultimate icehouse. *Proceedings of the National Academy of Sciences*.

Macarewich, S.I. and Poulsen, C.J. (2021, in preparation). Glacial-interglacial controls on ocean circulation and temperature during the Permo-Carboniferous.

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. (2021, 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 (Jan 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

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).

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 $\delta^{18}O$ in an isotope-enabled Earth system model*

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

Reviewer for *Palaeogeography*, *Palaeoclimatology*, *Palaeoecology* and *Geophysical Research Letters*