

Sophia Macarewicz

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Climate and Global Dynamics Laboratory
National Center for Atmospheric Research
1850 Table Mesa Drive, Boulder, CO, 80305

EDUCATION

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|---|--------------------------|
| Ph.D., Earth and Environmental Sciences <i>University of Michigan, Ann Arbor</i> <i>Advisor: Prof. Christopher Poulsen</i> | 2016 – 2021 GPA: 3.84 |
| B.S., Physical Geography and Environmental Studies <i>University of California, Santa Barbara</i> | 2012 – 2016 GPA: 3.68 |

RESEARCH EXPERIENCE

- Project Scientist I, National Center for Atmospheric Research January 2023 – present
- Postdoctoral Research Fellow, University of California, Davis February 2022 – December 2022
Projects: Simulation of western U.S. hydroclimate during the last deglaciation
- Graduate Research Assistant, University of Michigan September 2016 – December 2021
Projects: Simulation of ocean circulation and temperature during the Late Paleozoic Ice Age; Reconstruction of vegetation-climate interactions in Earth's past
- Student Researcher, University of California, Santa Barbara, Earth Research Institute September 2014 – June 2016
Projects: Ocean circulation and ecology in the Santa Barbara Channel; Extreme downslope wind and warming events in Santa Barbara
- Student Researcher, University of California, Santa Barbara, Marine Science Institute March 2013 – February 2015
Projects: Captive spawning of endangered abalone for the NOAA fisheries White Abalone Recovery Plan

RESEARCH GRANTS

- 2022 – 2023 Hydroclimate Response of the Southwestern United States to Past and Future Atlantic Meridional Overturning Circulation Weakening. NSF AGS Postdoctoral Research Fellowship, \$180,000. (PI)

HONORS AND AWARDS

- 2022 NSF Atmospheric and Geospace Sciences Postdoctoral Research Fellowship, University of California, Davis
- 2016 – 2021 Rackham Merit Fellowship, University of Michigan, Rackham Graduate School
- 2018 Michigan Institute for Computational Discovery and Engineering Fellowship Honorable Mention, University of Michigan
- 2015 Jack and Laura Dangermond Undergraduate Scholarship, University of California, Santa Barbara
- 2015 First Place in Undergraduate Research and Creative Activities Slam, University of California, Santa Barbara

PUBLICATIONS

7. Matthaeus, W.J., **Macarewicz, S.I.**, Richey, J.D., Montañez, I.P., McElwain, J.C., White, J.D., Wilson, J.P., Poulsen, C.J. (2023, accepted). A Systems Approach to Understanding How Plants Transformed Earth's Environment in Deep Time. *Annual Review of Earth and Planetary Sciences*.
6. **Macarewicz, S.I.** and Poulsen, C.J. (2022). Glacial-interglacial controls on ocean circulation and temperature during the Permo-Carboniferous. *Paleoceanography and Paleoclimatology*. DOI: <https://doi.org/10.1029/2022PA004417>
5. Chen, J., Montañez, I.P., Zhang, S., Isson, T.T., **Macarewicz, 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>
4. **Macarewicz, 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*. DOI: <https://doi.org/10.1016/j.epsl.2021.116770>
3. Matthaeus, W.J., **Macarewicz, 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>

2. 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 O_2 And Aridification. *American Journal of Science*. DOI: <https://doi.org/10.2475/09.2020.01>
1. 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>

INVITED PRESENTATIONS

- **Invited Speaker.** *Paleoclimate Data Assimilation Workshop*. Tucson, AZ: Uncertainty and complexity in paleoclimate simulations. October 2022.
- **Invited Speaker.** *UC Davis, Dept. of Earth and Planetary Sciences seminar series*. Davis, CA: Reconstructing a deep time Earth system: ocean dynamics and vegetation-climate interactions of the penultimate icehouse. May 2022.
- **Invited Speaker.** *Climate Meetings, Earth Research Institute, UC Santa Barbara*. Virtual: Reconstructing a deep time Earth system: vegetation-climate dynamics of the penultimate icehouse. February 2022.
- **Invited Speaker.** *earth2earth: UK-wide geoscience seminar series*. Virtual: Reconstructing a deep time Earth system: The penultimate icehouse with Dr. Isabel Montañez. April 2021.

OTHER SELECTED PRESENTATIONS

Research Talks

- **Macarewich, S.I.**, Poulsen, C.J., Matthaeus, W.J., Richey, J.D., White, and J.D., Montañez, I.P., DiMichele, W.A., Hren, M.T., McElwain, J.C. and Wilson, J.P., “Ecosystem-to-Global Scale Modeling of Vegetation-Climate Feedbacks During the Late Paleozoic Ice Age with Fossil-Based Plant Functional Types”. Goldschmidt, Honolulu, HI. July 2022.
- **Macarewich, S.I.**, Chen, J., Montañez, I.P., Zhang, S., Isson, T.T., Planavsky, N.J., Zhang, F., Rauzi, S., Daviau, K., Yao, L., Qi, Y., Wang, Y., Poulsen, C.J., Fan, J., Anbar, A., Shen, S. and Wang, X, “Ocean deoxygenation linked to abrupt global warming during the Earth’s penultimate icehouse”. National Center for Atmospheric Research (NCAR) Paleoclimate Working Group, Virtual. February 2021.
- **Macarewich, S.I.**, Matthaeus, W.J., Richey, J.D., Poulsen, C.J., White, and J.D., Montañez, I.P., “Ecosystem-to-global scale modeling of vegetation-climate feedbacks during the Late Paleozoic Ice Age”. American Geophysical Union Fall Meeting, Virtual. December 2020.
- **Macarewich, S.I.** and Poulsen, C.J., “Controls on Permo-Carboniferous tropical climate in Pangaea: Insights from iCESM”. CLIVAR Water Isotopes and Climate Workshop, Boulder, CO. October 2019.
- **Macarewich, S.I.**, Poulsen, C.J. and Montañez, I.P., “A new method for constraining seawater conditions in ancient epicontinental seas, with implications for oxygen isotope secular curves”. Community Earth System Model Workshop, Boulder, CO. June 2019.
- **Macarewich, S.I.**, Poulsen, C.J. and Montañez, I.P., “Decoupling of ancient epicontinental sea and open ocean $\delta^{18}O$ in an isotope-enabled Earth system model”. European Geophysical Union, Vienna, Austria. June 2019.
- **Macarewich, S.I.**, Poulsen, C.J. and Montañez, I.P., “Decoupling of Late Paleozoic epicontinental sea and open ocean $\delta^{18}O$ in iCESM”. NCAR Paleoclimate Working Group, Boulder, CO. February 2019.

Research Posters

- **Macarewich, S.I.** and Poulsen, C.J., “Global Climate Simulations of Glacial-Interglacial Ocean Circulation and Temperature During the Permo-Carboniferous”. American Geophysical Union Fall Meeting, New Orleans, LA. December 2021.
- **Macarewich, S.I.**, Poulsen, C.J., Richey, J.D. and Montañez, I.P., “A Model-Based Evaluation of Permo-Carboniferous Climate Change in Tropical Pangaea”. American Geophysical Union Fall Meeting, San Francisco, CA. December 2019.
- **Macarewich, S.I.**, Poulsen, C.J., Montañez, I.P. and Griffis, N.P., “Decoupling of Late Paleozoic epicontinental sea and open ocean $\delta^{18}O$ in a fully coupled isotope-enabled Earth system model”. American Geophysical Union Fall Meeting, Washington, D.C. December 2018.

PROGRAMMING EXPERIENCE

Python, NCAR Command Language, Matlab, Fortran

CLIMATE MODELING EXPERIENCE

NCAR Community Earth System Model, GENESIS Global Climate Model

TEACHING EXPERIENCE

- **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 and Summer 2018.

LEADERSHIP, OUTREACH, AND MENTORSHIP

- Graduate Modules on Mental Health, Developed course modules on mental health topics for the first-year graduate seminar in the Earth and Environmental Sciences at University 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 and Environmental Sciences at University of Michigan, February – December 2020.
- Dana Hills High School Marine Ecology Field Course, Taught high school students 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 University of Michigan, February 2017.
- UC Academic Advising Conference, Presented 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. December 2021.
- **Reviewer**: *Palaeogeography, Palaeoclimatology, Palaeoecology, Geophysical Research Letters, Paleoceanography and Paleoclimatology*, and *Proceedings of the National Academy of Sciences*

updated January 2023