

Alexander J. Thompson, Ph.D.

Research Scientist I

Cooperative Institute for Research in Environmental Sciences, University of Colorado
Boulder and NOAA Physical Sciences Laboratory

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EDUCATION

- 2021 **Ph.D. Earth and Environmental Sciences**, University of Michigan, Ann Arbor
Dissertation: Modeling the Regional and Global Climate Responses to Holocene Land Surface Change
- 2015 **B.S. Program in the Environment**, University of Michigan, Ann Arbor
- 2015 **B.S. Earth and Environmental Sciences**, University of Michigan, Ann Arbor
Thesis: Climatic Response of the Central African Dry Season to the RCP8.5 Climate Change Scenario Using CMIP5 Ensemble

PROFESSIONAL EXPERIENCE

- May 2024 –
PRESENT **Research Scientist I**
Cooperative Institute for Research in Environmental Sciences (CIRES)
University of Colorado, Boulder, CO
NOAA Physical Sciences Laboratory – Affiliate
- Contributing to research on probable maximum precipitation as a member of the Precipitation Processes and Extremes team within the Hydrology Applications Division
 - Leading long-term project generating large ensemble of dynamically downscaled global climate model simulations at kilometer-scale resolution over CONUS for extreme precipitation analysis
 - Supervisor for CIRES postdoctoral researcher
- AUG 2021 –
APR 2024 **Postdoctoral Research Associate**
Department of Earth and Planetary Sciences, Washington University, St. Louis, MO
- *Research in Future Extremes*: Developed novel method of blending rainfall observations with CESM to more robustly assess the historical context of extreme precipitation in the USA
 - *Research in Past Extremes*: Synthesized global CESM simulations equipped with water and isotopic tracers to quantify changes in Central American rainfall during past glacial periods
 - Collaborated with interdisciplinary team of geologists, geochemists, and climate scientists
 - Created Python-based [website](#) for visualizing modern extreme events within their climate history
- SEPT 2016 –
AUG 2021 **Graduate Student Research Assistant/Graduate Student Instructor**
Department of Earth and Environmental Sciences, University of Michigan, Ann Arbor, MI
- Designed and published climate model experiments that investigated the role of the land surface in modulating global and regional temperature and precipitation during the Holocene
- JUN 2015 –
JUN 2016 **Research Analyst**
Industrial Economics, Inc. (IEc), Cambridge, MA
- Supported data management team from NOAA and DOI to develop public data repositories for the Deepwater Horizon oil spill's natural resource damage assessment (largest in USA history)

PUBLICATIONS (H-INDEX: 3, CITATIONS: 108)

REFEREED JOURNAL ARTICLES

- 2022 **Thompson AJ**, Zhu J, Poulsen CJ, Tierney JE, Skinner CB. (2022). Northern Hemisphere vegetation change drives a Holocene thermal maximum. *Science Advances*. <https://doi.org/10.1126/sciadv.abj6535>
Media coverage from: [Washington University](#), [Phys.org](#), [ScienceDaily](#), [Advanced Science News](#)
- 2021 **Thompson AJ**, Tabor CR, Poulsen CJ, Skinner CB. (2021). Water isotopic constraints on the enhancement of the mid-Holocene West African monsoon. *Earth and Planetary Science Letters*, 116677. <https://doi.org/10.1016/j.epsl.2020.116677>
- 2019 **Thompson AJ**, Skinner CB, Poulsen CJ, Zhu J. (2019). Modulation of mid-Holocene African rainfall by dust aerosol direct and indirect effects. *Geophysical Research Letters*, 46, 3917-3926. <https://doi.org/10.1029/2018GL081225>

MANUSCRIPTS UNDER EVALUATION

- 2024 Todd V, Shanahan T, DiNezio P, Klavans J, Fawcett P, Andreson RS, Jimenez-Moreno G, LeGrande A, Pausata F, **Thompson A**, Zhu J. North Pacific response to hemispheric warming forces Holocene drought. Under evaluation at *Nature Communications*.
- 2024 **Thompson AJ**, Konecky BL, Hutchings JA. The 1,000-year context of extreme precipitation in the Central US from a novel blend of observations and climate model simulations. Under evaluation at *Journal of Climate*.

MANUSCRIPTS IN PREPARATION

- 2024 **Thompson AJ**, Konecky BL, Berke MA, Werne JP, Arnold TE. Towards an improved understanding of Central American hydroclimate during the Last Glacial Maximum: Insights from global water tracer simulations. In prep for *Journal of Geophysical Research: Atmospheres*.

NON-PEER REVIEWED ARTICLES

- 2023 **Thompson AJ**. (2023). Increases in vegetation influenced past temperatures. *The Science Breaker*. <https://doi.org/10.25250/thescbr.brk672>

AWARDS AND GRANTS

- 2021 NSF Atmospheric and Geospace Sciences Postdoctoral Fellowship

SELECTED PRESENTATIONS

INVITED PRESENTATIONS

- 2023 **Thompson AJ**, Konecky BL, Berke MA, Werne JP, Arnold TE. Implications of paleoclimate modeling for future Central American hydroclimate, 2023 AGU Fall Meeting (virtually attended) (invited poster).
- 2023 **Thompson AJ**. Central American hydroclimate during the Last Glacial Maximum: Insights from global water tracer simulations. Woods Hole Oceanographic Institute Climate & Paleo Seminar, February 9, 2023.

SELECTED SEMINAR AND CONFERENCE PRESENTATIONS (9 of 20)

- 2024 **Thompson AJ**, Mahoney KM, Prein AF. Kilometer-scale downscaling of CESM2 Large Ensemble simulations over CONUS, 2024 AGU Fall Meeting, Washington, D.C. (poster).
- 2024 **Thompson AJ**, Mahoney K, Kholodovsky V. Modernizing NOAA's extreme precipitation guidance for high-hazard infrastructure in a changing climate, NOAA Physical Sciences Laboratory Seminar, October 22, 2024.

- 2023 **Thompson AJ**, Konecky BL, Hutchings JA. Novel approach of blending observations and climate models to contextualize the July 2022 extreme precipitation event in the Central US, 2023 AGU Fall Meeting (virtually attended) (poster).
- 2023 **Thompson AJ**, Konecky BL, Hutchings JA. Blending observations with CESM to assess the historical context of lower Midwest extreme precipitation, 2023 CESM Workshop, June 12-14, Boulder, CO (oral).
- 2022 **Thompson AJ**, Konecky BL, Berke MA, Werne JP, Towards an improved understanding of Central American hydroclimate during the Last Glacial Maximum: Insights from global water tracer simulations, 2022 AGU Fall Meeting, December 12-16, Chicago, IL (oral).
- 2022 **Thompson AJ**, Konecky BL, Moisture source and isotopic changes in the Yucatán Peninsula during the Last Glacial Maximum, 2022 CESM Workshop, June 13-16, 2022 (virtually attended) (oral).
- 2021 **Thompson AJ**, Zhu J, Poulsen CJ, Constraining hydroclimate interpretations of the North American monsoon since the Last Glacial Maximum, 2021 AGU Fall Meeting, December 13-17, 2021, New Orleans, LA (virtually attended) (poster).
- 2020 **Thompson AJ**, Zhu J, Poulsen CJ, Increased Northern Hemisphere vegetation cover as a potential solution to the Holocene Temperature Conundrum, 2020 American Geophysical Fall Meeting, December 1-17, 2020 (virtually attended) (oral).
- 2019 **Thompson AJ**, Tabor CR, Poulsen CJ, Re-evaluation of leaf wax hydrogen stable isotopic signal from a case study of model-proxy discrepancy in mid-Holocene northern Africa, 2019 CLIVAR Water Isotopes and Climate Workshop, October 2, 2019, Boulder, CO (poster).

PROFESSIONAL ACTIVITIES AND SERVICE

- 2024 **Member**, NOAA Physical Sciences Laboratory 2024 Science Day Planning Committee
- 2023 **Convener** of 2023 AGU Fall Meeting session "PP008: Africa's Climate and Ecosystem History: Approaches Using Proxy and Modeling Analysis Frameworks".
- 2019– **Reviewer** for *Climate of the Past*, *Journal of Climate*, *Nature*, *Science Advances*, *AGU Advances*, *Communications Earth & Environment*, *Nature Communications*, *Geology*, *Climate Dynamics*, *Journal of Geophysical Research: Atmospheres*, *Paleoceanography and Paleoclimatology*, and *PLOS ONE*.
- 2018– **Member** of American Geophysical Union

SELECTED SKILLS

- LANGUAGES | Python (e.g., numpy, xarray, pandas, geopandas, matplotlib, cartopy, geocat, scipy), Fortran, NCL
- COMPUTING | Linux/Unix environments, Jupyter notebooks, High performance computing, Shell/Bash scripting
- REANALYSIS | ECMWF Reanalysis v5 (ERA5), Analysis of Record for Calibration (AORC), NCEP/NCAR Reanalysis, NASA Modern-Era Retrospective analysis for Research and Applications v2 (MERRA2), Global Precipitation Climatology Centre (GPCC), Global Precipitation Climatology Project (GPCP)
- MODELS | Community Earth System Model (CESM), Weather Research and Forecasting (WRF)
- DATA | Historical temperature and precipitation data from NOAA's Applied Climate Information System
- TOOLS | ESRI ArcGIS, Adobe Illustrator, VIM text editor, NetCDF Operators (NCO), Globus File Manager
- SCICOMM | Led 10+ public science workshops, activities, and talks in schools, libraries, museums, and bars

COMMUNICATION AND PUBLIC OUTREACH

ADVANCING DIVERSITY AND INCLUSION IN STEM

2018–2020 Camp counselor for University of Michigan's [Earth Camp](#), a summer camp that exposes under-represented high school students to earth and environmental science through field trip activities.

COMMUNICATING CLIMATE SCIENCE THROUGH PUBLIC WORKSHOPS

2023 "Using climate models to investigate extreme precipitation in St. Louis" public talk for Taste of Science event: *Furies of our planet and global warming*.

2023 "Using climate models to investigate glacial-scale climate in Central America and extreme precipitation in St. Louis" Brown Bag talk in the Dept. of Earth and Planetary Sciences at Washington University in St. Louis.

2022 "Using climate models to study past and present changes in the hydrologic cycle" public talk at Washington University Climate Change Program Lunch and Learn.

2019 – 2020 Nine (9) public workshops in schools, libraries, and museums on climate models and paleoclimate

TEACHING EXPERIENCE

Winter 2024 Guest lecturer, "*Ecoclimatology*" (Mar. 21, 2024), *The Earth's Climate System*, Department of Earth and Planetary Sciences, Washington University in St. Louis

Fall 2022 Guest lecturer, "*Ecoclimatology*" (Oct. 31, 2022), *The Earth's Climate System*, Department of Earth and Planetary Sciences, Washington University in St. Louis

Winter 2020 Graduate Student Instructor, *Geology of the National Parks*, Department of Earth and Environmental Sciences, University of Michigan – Ann Arbor (**transitioned to virtual learning during COVID-19**) – Guest lecture: "Evolution of Earth's Climate History during the Phanerozoic"

Winter 2019 Graduate Student Instructor, *Geology of the National Parks*, Department of Earth and Environmental Sciences, University of Michigan – Ann Arbor

Summer 2017 Graduate Student Instructor, *Introduction to Earth and Environmental Science in the Rockies*, University of Michigan Department of Earth and Environmental Sciences Camp Davis Rocky Mountain Field Station, Jackson, Wyoming

Fall 2016 Graduate Student Instructor, *Introduction to Global Change: The Science of Sustainability*, Department of Earth and Environmental Sciences, University of Michigan – Ann Arbor