Karen Aline McKinnon

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EDUCATION

Harvard University, Cambridge, MA

Ph.D. in Earth and Planetary Science (2015)
Understanding and predicting temperature variability in the observational record
Secondary field in Computational Science and Engineering (2015)

Harvard University, Cambridge, MA

M.A. in Earth and Planetary Science (2014)

Victoria University, Wellington, New Zealand

M.Sc in Geophysics, with Distinction (2011)
The Role of Climate and Bed Topography on the Evolution of the Tasman Glacier Since the Last Glacial Maximum

Harvard University, Cambridge, MA

B.A. in Earth and Planetary Science, minor in Mathematical Sciences,
summa cum laude (2010)

APPOINTMENTS

University of California, Los Angeles, Los Angeles, CA   **2024 −**
Department of Atmospheric and Oceanic Sciences
Department of Statistics and Data Science
Institute of the Environment and Sustainability
Associate Professor with tenure

University of California, Los Angeles, Los Angeles, CA   **2018 − 2024**
Department of Statistics and Institute of the Environment and Sustainability
Department of Atmospheric and Oceanic Sciences (2021 − 2024)
Assistant Professor

Descartes Labs, Santa Fe, NM   **2017 − 2018**
Applied Scientist

National Center for Atmospheric Research, Boulder, CO   **2015 − 2017**
Division of Climate and Global Dynamics
Advanced Study Program post-doctoral fellow

GRANTS AND FELLOWSHIPS

NSF CAREER, Award 2338237, $944,511   **2024-2029**
CAREER: Understanding Changes in Summertime Continental Temperature Extremes

NOAA Modeling, Analysis, Predictions, and Projections, $53,685   **2023-2025**
Co-Principal Investigator
Understanding and Resolving a Global Discrepancy in Near Surface Water Vapor Trends Between Models and Observations

Packard Foundation DEI Pilot Grant:
Undergraduate Research in Geosciences for UnderRepresented Groups, $26,000   **2022-2023**

Packard Fellowship for Science and Engineering, $875,000   **2021-2026**

UCLA Hellman Society Fellow, $20,000	**2021-2022**
UCLA IoES Pritzker Chair in Environment and Sustainability, $120,000	**2020-2023**
NSF Climate and Large Scale Dynamics, Award 1939988, $619,945 Principal Investigator *The factors governing daily near-surface air temperature variability over land*	**2020-2024**
NCAR Advanced Study Program Postdoctoral Fellowship *Bridging the weather-climate gap for extremes*	**2015**
NSF Atmospheric and Geospace Sciences Postdoctoral Fellowship (declined)	**2015**
NASA Earth and Space Science Fellowship *An examination of Earth's seasonal heat budget*	**2014**
NSF Graduate Research Fellowship *The climate sensitivity continuum*	**2011**
Harvard Smith Family Graduate Fellowship	**2011**

AWARDS AND HONORS

Kavli Fellow	**2023**
Packard Fellow in Science and Engineering	**2021**
Editors' Citation for Excellence in Refereeing for Geophysical Research Letters	**2016**
Derek Bok Center Certificate of Distinction in Teaching	**2011**
Phi Beta Kappa	**2010**

PUBLICATIONS

*indicates graduate student first author
**indicates post-doc first author
McKinnon group (members underlined) publications list authors in order of contribution.

2025

45. **Duan, S.Q., **K.A. McKinnon**, and I.R. Simpson, 2025. The impact of soil preconditioning on the evolution of heatwaves under constrained circulation: a case study of the 2021 Pacific Northwest heatwave. *Earth's Future*, doi: 10.1029/2025EF006216.

44. *Hwangbo, N., **K.A. McKinnon**, and K.J. Anchukaitis, 2025. Simultaneous Optimal Target Season Estimation and Local Climate Reconstruction Using Tree Rings. *Geophysical Research Letters*, doi: 10.1029/2025GL116495.

43. **Madakumbura, G.D., M.A. Moritz, **K.A. McKinnon**, A.P. Williams, S. Rahimi, B. Bass, J. Norris, R. Fu, and A. Hall, 2025. Anthropogenic warming drives earlier wildfire season onset in California. *Science Advances*, doi: 10.1126/sciadv.adt2041.

42. Hidalgo, H., S.W. Chou-Chen, **K.A. McKinnon**, S. Pascale, D. Quesada-Chacón, E.J. Alfaro, P. Bautista-Solís, P.M. Pérez-Briceño, H. F. Diaz, T. Maldonado, E.R. Rivera, and T. Nakaegawa, 2025. Detection and attribution of trends of meteorological extremes in Central America. *Climatic Change*, doi:10.1007/s10584-025-03940-5.

2024

41. **McKinnon, K.A.**, I.R. Simpson, and A.P. Williams, 2024. The pace of change of summertime temperature extremes. *Proceedings of the National Academy of Sciences*, 121 (42), e2406143121, doi:10.1073/pnas.2406143121.

40. Byrne, M.P., G.C. Hegerl, J. Scheff, O. Adam, A. Berg, M. Biasutti, S. Bordoni, A. Dai, R. Geen, M. Henry, S.A. Hill, C. Hohenegger, V. Humphrey, M. Joshi, A.G. Konings, M.M. Laguë, F.H. Lambert, F. Lehner, J.S. Mankin, K.A. McColl, **K.A. McKinnon**, A.G. Pendergrass, M. Pietschnig, L. Schmidt, A.P. Schurer, E.M. Scott, D. Sexton, S.C. Sherwood, L. Vargas Zeppetello, and Y. Zhang, 2024. Theory and the future of land-climate science. *Nature Geoscience*, doi:10.1038/s41561-024-01553-8.

39. Williams, A.P., **K.A. McKinnon**, K.J. Anchukaitis, A. Gershunov, A.M. Varuolo-Clarke, R.E.S. Clemesha, and H. Liu, 2024. Anthropogenic intensification of cool-season precipitation is not yet detectable across the Western United States. *Journal of Geophysical Research: Atmospheres*, doi:10.1029/2023JD040537.

38. **Duan, S.Q.**, **K.A. McKinnon**, and I.R. Simpson, 2024. Two perspectives on amplified warming over tropical land examined in CMIP6 models. *Journal of Climate*, doi:10.1175/JCLI-D-22-0955.1.

37. *Jacobson, T.W.P., R. Seager, A.P. Williams, I.R. Simpson, **K.A. McKinnon**, and H. Liu, 2024. An unexpected decline in spring atmospheric humidity in the interior Southwestern United States and implications for forest fires. *Journal of Hydrometeorology*, doi:10.1175/JHM-D-23-0121.1.

36. Simpson, I.R., **K.A. McKinnon**, D. Kennedy, D.M. Lawrence, F. Lehner, and R. Seager, 2024. Observed humidity trends in dry regions contradict climate models. *Proceedings of the National Academy of Sciences*, doi:10.1073/pnas.2302480120.

35. **McKinnon, K.A.**, and P.J. Huybers, 2024. Inferring Northern Hemisphere continental warming patterns from the amplitude and phase of the seasonal cycle in surface temperature. *Journal of Climate*, doi:10.1175/JCLI-D-22-0773.1.

2023

34. *Anderson, T.G., **K.A. McKinnon**, D. Pons, and K.J. Anchukaitis, 2023. How exceptional was the 2015-2019 Central American Drought?. *Geophysical Research Letters*, doi:10.1029/2023GL105391.

33. **Kong, W.**, **K.A. McKinnon**, I.R. Simpson, and M.M. Laguë, 2023. Understanding responses of summer continental daily temperature variance to perturbations in the land surface evaporative resistance. *Journal of Climate*, doi:10.1175/JCLI-D-21-1011.1.

2022

32. **McKinnon, K.A.**, and I.R. Simpson, 2022. How unexpected was the 2021 Pacific Northwest heatwave?. *Geophysical Research Letters*, doi:10.1029/2022GL100380.

31. *Horowitz, R.L., **K.A. McKinnon**, and I.R. Simpson, 2022. Circulation and Soil Moisture Contributions to United States Heatwaves. *Journal of Climate*, doi:10.1175/JCLI-D-21-0156.1.

30. *Olivarez, H., N. Lovenduski, R. Brady, A. Fay, M. Gehlen, L. Gregor, P. Landschutzer, G. McKinley, **K.A. McKinnon**, D. Munro, 2022. Replaying the tape of history: Synthetic large ensembles of sea-air carbon dioxide (CO2) flux. *Global Biogeochemical Cycles*, doi:10.1029/2021GB007174.

McKinnon, K.A., 2022. Discussion on "A combined estimate of global temperature". *Environmetrics*, doi:10.1002/env.2721. *(Invited commentary, not peer reviewed.)*

29. Simpson, I.R., D.M. Lawrence, S.C. Swenson, C. Hannay, **K.A. McKinnon**, and J.E. Truesdale, 2022. Improvements in wintertime surface temperature variability in the Community Earth System Model version 2 (CESM2) related to the representation of snow density. *Journal of Advances in Modeling Earth Systems*, doi:10.1029/2021MS002880.

28. Williams, A.P., B. Livneh, **K.A. McKinnon**, W.D. Hansen, J.S. Mankin, B.I. Cook, J.E.

Smerdon, A.M. Varuolo-Clarke, N.R. Bjarke, C.D. Juang, and D.P. Lettenmaier, 2022. Growing impact of wildfire on western United States water supply. *Proceedings of the National Academy of Sciences*, doi:10.1073/pnas.2114069119.

27. *Baugh, S., and **K.A. McKinnon**, 2022. Hierarchical Bayesian Modeling of Ocean Heat Content and Its Uncertainty. *Annals of Applied Statistics*, doi:10.1214/22-AOAS1605.

2021

26. **McKinnon, K.A.** and C. Deser, 2021. The inherent uncertainty of precipitation variability, trends, and extremes due to internal variability, with implications for Western US water resources. *Journal of Climate*, doi:10.1175/JCLI-D-21-0251.1.

25. *Elsworth, G.W., N.S. Lovenduski, and **K.A. McKinnon**, 2021. Alternate history: A synthetic ensemble of ocean chlorophyll concentrations. *Global Biogeochemical Cycles*, doi:10.1029/2020GB006924.

24. **McKinnon, K.A.**, A. Poppick, and I.R. Simpson, 2021. Hot extremes have become drier in the United States Southwest. *Nature Climate Change*, 11, 598-604, doi:10.1038/s41558-021-01076-9.

23. Simpson, I.R., **K.A. McKinnon**, F. Davenport, M. Tingley, F. Lehner, A. Al Fahad, and D. Chen, 2021. Emergent constraints on the large scale atmospheric circulation and regional hydroclimate: do they still work in CMIP6 and how much can they actually constrain the future? *Journal of Climate*, doi: 10.1175/JCLI-D-21-0055.1.

2020

22. Poppick, A. and **K.A. McKinnon**, 2020. Observation-based Simulations of Humidity and Temperature Using Quantile Regression. *Journal of Climate*, 33 (24), 10691-10706.

21. Mankin, J.S., F. Lehner, S. Coats and **K.A. McKinnon**, 2020. The value of initial condition large ensembles to robust adaptation decision-making. *Earth's Future*, 8 (10).

20. **McKinnon, K.A.** and A. Poppick, 2020. Estimating changes in the observed relationship between humidity and temperature using noncrossing quantile smoothing splines. *Journal of Agricultural, Biological, and Environmental Statistics*, 25 (3), 292-314.

19. *Elsworth, G.W., N.S. Lovenduski, **K.A. McKinnon**, K.M. Krumhardt and R.X. Brady, 2020. Finding the fingerprint of anthropogenic climate change in marine phytoplankton abundance. *Current Climate Change Reports*, 6 (2), 37-46.

18. Deser, C., F. Lehner, K.B. Rodgers, T. Ault, T.L. Delworth, P.N. DiNezio, A. Fiore, C. Frankignoul, J. C. Fyfe, D.E. Horton, J.E. Kay, R. Knutti, N.S. Lovenduski, J. Marotzke, **K.A. McKinnon**, S. Minobe, J. Randerson, J.A. Screen, I.R. Simpson and M. Ting, 2020. Insights from Earth system model initial-condition large ensembles and future prospects. *Nature Climate Change*, 10, 277-286.

2019

17. *Merrifield, A.L., I.R. Simpson, **K.A. McKinnon**, S. Sippel, S.-P. Xie and C. Deser, 2019. Evidence of non-local land surface influence in a European heatwave initial condition ensemble. *Geophysical Research Letters*, 46, 14082-14092.

16. Simpson, I.R., S. Yeager, **K.A. McKinnon** and C. Deser, 2019. Decadal predictability of late winter precipitation in western Europe through an ocean-jet stream connection. *Nature Geoscience*, 12, 613-619.

2018

15. Simpson, I.R., C. Deser, **K.A. McKinnon**, and E.A. Barnes, 2018. Modelled and observed multidecadal variability in the North Atlantic jet stream and its connection to Sea Surface Temperatures. *Journal of Climate*, 31 (20), 8313-8338.

14. **McKinnon, K.A.** and C. Deser, 2018. Internal variability and regional climate trends in an Observational Large Ensemble. *Journal of Climate*, 31 (17), 6783-6802.

13. Deser, C., I.R. Simpson, A.S. Phillips, and **K.A. McKinnon**, 2018. How well do we know ENSO's climate impacts over North America, and how do we evaluate models accordingly? *Journal of Climate*, 31 (13), 4991-5014.

2017

12. **McKinnon, K.A.**, A. Poppick, E. Dunn-Sigouin, and C. Deser, 2017. An 'Observational Large Ensemble' to compare observed and modeled temperature trend uncertainty due to internal variability. *Journal of Climate*, 30 (19), 7585-7598.

11. Deser, C., I.R. Simpson, **K.A. McKinnon**, and A.S. Phillips, 2017. The Northern Hemisphere extra-tropical atmospheric circulation response to ENSO: How well do we know it and how do we evaluate models accordingly? *Journal of Climate*, 30 (13), 5059-5082.

2016

10. Rhines, A., **K.A. McKinnon**, M.P. Tingley, and P. Huybers, 2016. Seasonally Resolved Distributional Trends of North American Temperatures Show Contraction of Winter Variability. *Journal of Climate*, 30 (3), 1139-1157.

9. **McKinnon, K.A.** and P. Huybers, 2016. Seasonal constraints on inferred planetary heat content. *Geophysical Research Letters* 43 (20), 10955-10964.

8. **McKinnon, K.A.**, A. Rhines, M.P. Tingley and P. Huybers, 2016. The changing shape of Northern Hemisphere summer temperature distributions. *Journal of Geophysical Research: Atmospheres*, 121 (15), 8849-8868.

7. **McKinnon, K.A.**, A. Rhines, M.P. Tingley and P. Huybers, 2016. Long-lead predictions of Eastern US hot days from Pacific sea surface temperatures. *Nature Geoscience*, 9, 389-394.

2015

6. Mueller, N.D., E.E. Butler, **K.A. McKinnon**, A. Rhines, M. Tingley, N.M. Holbrook and P. Huybers, 2015. Cooling of US Midwest summer temperature extremes from cropland intensification. *Nature Climate Change*, 6, 317-322.

5. Rhines, A., M.P. Tingley, **K.A. McKinnon** and P. Huybers, 2015. Decoding the precision of historical temperature observations. *Quarterly Journal of the Royal Meteorological Society*, 141 (693), 2923-2933.

2014

4. **McKinnon, K.A.** and P. Huybers, 2014. On using the seasonal cycle to interpret extratropical temperature changes since 1950. *Geophysical Research Letters*, 41 (13), 4676-4684.

3. Huybers, P., **K.A. McKinnon**, A. Rhines and M. Tingley, 2014. U.S. daily temperatures: the meaning of extremes in the context of non-normality. *Journal of Climate*, 27 (19) 7368-7384.

2013

2. **McKinnon, K.A.**, A.R. Stine and P. Huybers, 2013. The spatial structure of the seasonal cycle in surface temperature: amplitude, phase, and Lagrangian history. *Journal of Climate*, 26 (20), 7852-7862.

2012

1. **McKinnon, K.A.**, A.N. Mackintosh, B.M. Anderson and D.J.A. Barrell, 2012. The influence of sub-glacial bed evolution on ice extent: a model-based evaluation of the Last Glacial Maximum Pukaki glacier, New Zealand. *Quaternary Science Reviews*, 57, 46-57.

TEACHING

- Monte Carlo Methods (Spring quarter 2022, 2024, 2025)
- Introduction to Environmental Science (Winter quarter 2022, 2024, 2025)
- Modern Environmental Statistics (Winter quarter 2019, Spring quarter 2022, 2024, 2025)

- IoES Senior Practicum (Winter-Spring 2019)
- Advanced Climate Dynamics Course lecturer (Summer 2019)

<table>
<tr><td>GRADUATE
STUDENTS</td><td>Committee chair: Nathan Hwangbo (PhD 2025), Samuel Baugh (PhD 2022), Surabhi Agrawal (MS 2022), Russell Horowitz (MS 2021), Kyle McEvoy (4th year PhD candidate), Mady Beckner (3rd year PhD student)</td></tr>
</table>

Committee member (graduated students only): Todd Emmenegger (PhD 2024), Yu-Chuan Tien (PhD 2024), Gavin Madakumbura (PhD 2024), Paul Stainier (PhD 2024), Thomas Maierhofer (PhD 2023), Andrew Kaplan (PhD 2022), Weiming Ma (PhD 2022), Kimberly Wang (PhD 2022), Mingxin Qu (MS 2022)

INVITED ACADEMIC PRESENTATIONS

US CLIVAR Summit, Boulder, CO, July 2025.

Third Harvard University Continental Climate Workshop, Cambridge, MA, May 2025.

University of Texas at Austin DeFord Lecture Series, Austin, TX, April 2025.

University of Southern California Biostatistics Seminar Series, Los Angeles, CA, February 2025.

NOAA GFDL formal seminar series, Princeton, NJ, November 2024.

JPL Climate Risk workshop on Usable Climate Risk Science, Pasadena, CA, October 2024.

Second Harvard University Continental Climate Workshop, Cambridge, MA, June 2024.

US CLIVAR workshop on "Confronting Earth System Model Trends with Observations: The Good, the Bad, and the Ugly", Boulder, CO, March 2024.

University of California, San Diego (Scripps Institute of Oceanography) Climate, Atmospheric Sciences, and Physical Oceanography Seminar, San Diego, CA, March 2024.

University of California, Santa Cruz Applied Math Seminar, Virtual, March 2024.

American Geophysical Union Fall Meeting, Session "Heat Waves Behind the Scenes: Drivers, Mechanisms, and Impacts", San Francisco, CA, December 2023.

Texas A&M Atmospheric Sciences Seminar, College Station, TX, November 2023.

Berkeley Atmospheric Sciences Center Seminar, Berkeley, CA, October 2023.

Wharton Statistics and Data Science Seminar, Philadelphia, PA, October 2023.

University of Maryland Earth System Science Interdisciplinary Center (ESSIC) Seminar Series, Virtual, September 2023.

Colorado State University, Atmospheric Science Colloquium, Fort Collins, CO, August 2023.

Harvard University Continental Climate Workshop, Cambridge, MA, June 2023.

Clemson University Workshop on Weather and Climate Extremes, Clemson, SC, May 2023.

Florida State University, Earth, Ocean, Atmospheric Sciences Colloquium, Virtual, October 2022.

Institute for Mathematical and Statistical Innovation Detection and Attribution of Climate

Change workshop, Hybrid (Chicago, IL), October 2022.

Institute for Mathematical and Statistical Innovation Climate and Weather Extremes workshop, Hybrid (Chicago, IL), October 2022.

Meta AI4Science Seminar Series, Virtual, August 2022.

Amazon Consumer Science Summit Plenary, Cle Elum, WA, August 2022.

Joint Statistical Meeting, Topic Contributed Session "Addressing important questions in climate science using advanced statistical and machine-learning approaches", Washington, DC, August 2022.

Continental Climate Change Carnegie Research workshop, Edinburgh, Scotland, June 2022.

University of Reading, Department of Meteorology Seminar, Virtual, March 2022.

Stanford University, Earth System Science Seminar, Virtual, February 2022.

University of California, Santa Cruz Earth and Planetary Sciences Department Whole Earth Seminar, Virtual, January 2022.

American Geophysical Union Fall Meeting, Session "Climate Variability Across Scales and Climate States and Neural Earth System Modeling", Virtual, December 2021.

American Geophysical Union Fall Meeting, Session "Harnessing Earth System Data for Understanding and Predicting Climate Extremes in Agriculture and Urban Systems", Virtual, December 2021.

NeurIPS tutorial on Machine Learning and Statistics for Climate Science, Virtual, December 2021.

University of California, Irvine Department of Statistics Seminar, Irvine, CA, December 2021.

University of British Columbia Department of Earth, Ocean and Atmospheric Sciences Seminar, Virtual, April 2021.

University of Washington Atmospheric Science Colloquium, Virtual, February 2021.

Climate Informatics Keynote, Virtual, September 2020.

University of Washington Program on Climate Change Summer Institute on Climate Extremes and Climate and Environmental Equity, Virtual, September 2020.

University of Southern California Earth Sciences department seminar, Los Angeles, CA, January 2020.

American Geophysical Union Fall Meeting, Session "Bridging the Gap from Climate to Extreme Weather: Observations, Theory, and Modeling", San Francisco, CA, December 2019.

University of Arizona joint Geosciences-Geography Colloquium, Tucon, AZ, November 2019.

University of Chicago Geophysical Sciences seminar, Chicago, IL, May 2019.

UCI Earth System Science seminar, Irvine, CA, April 2019.

UCSB Statistics seminar, Santa Barbara, CA, April 2019.

UCLA Atmospheric and Oceanic Sciences seminar, Los Angeles, CA, April 2019.

Caltech ESE seminar, Pasadena, CA, January 2019.

Harvard Earth and Planetary Sciences ClimaTea, Cambridge, MA, April 2018.

NCAR CESM tutorial, Boulder, CO, August 2017.

American Physical Society Annual Meeting, New Orleans, LA, March 2017.

COLA lecture series, George Mason University, July 2016.

Uncertainty and Causality Assessment in Modeling Extreme and Rare Events workshop, NCAR, April 2016.

Data analysis and extremes workshop, Harvard University, April 2016.

International Detection and Attribution Group meeting, NCAR, February 2016.

Institute for Mathematics Applied to Geosciences (IMAGe) Seminar, NCAR, January 2016.

MIT Sack Lunch Seminar, December 2014.

SELECTED OTHER PRESENTATIONS

Weather and Climate Livestream Keynote, Virtual, May 2025.

Bruin Family Weekend faculty lecture, Los Angeles, CA, October 2023.

Distinguished Women in Statistics lecture hosted by the UCLA Society for Women in Statistics, Los Angeles, CA, January 2019.

New Mexico Women in Technology keynote address, Albuquerque, NM, March 2018.

LEADERSHIP AND AND SERVICE

Member of the National Academies' Future of Drought in the United States consensus study committee, 2024–

Editorial Board member, Environmental Research Letters, 2025–

Editor, Journal of Climate, 2025–

Co-lead of the 5th NOAA Drought Task Force, 2024–

Member of the WMO Task Team on methods and monitoring of temperature in alignment with the Paris Agreement goals, 2024–

Co-organizer of the ForceSMIP workshop and hackathon, August 2023

Member of the World Climate Research Programme (WCRP) My Climate Risk Scientific Steering Group, 2022–

Member of the UCLA Center for the Study of Women Advisory Committee, 2022–

Associate Editor, Journal of Climate, 2021–2024

Member of the Advisory Panel of the Climate & Global Dynamics Laboratory at the National Center for Atmospheric Research, 2021–

Member of UCLA Institute for Digital Research and Education Board, 2020–2025

Member of the American Meteorological Society (AMS) Climate Variability and Change Committee, 2020–

Member of Cervest Climate Intelligence Council, 2021-2023

Invited Scientific Reviewer for the Greater Boston Research Advisory Group climate change report, 2021.

Invited session organizer for 'The use of large ensembles in understanding climate variability and change', 33rd Conference on Climate Variability and Change at AMS 2020.

Member of the Scientific Organizing Committee for the Large Ensemble Workshop, July 2019.

Member of the US CLIVAR Large Ensemble working group, 2018–2021.

Reviewer for the National Science Foundation, Nature, Science, Nature Geoscience, Nature Climate Change, Nature Communications, npj Climate and Atmospheric Science, Science Advances, Geophysical Research Letters, Journal of Climate, Journal of the Atmospheric Sciences, Journal of Geophysical Research-Atmosphere, Climate Dynamics, Climatic Change, Bulletin of the American Meteorological Society, Weather and Climate Extremes