

Karen Aline McKinnon

CONTACT INFORMATION	Mathematical Sciences Building 8967 520 Portola Plaza Los Angeles, CA 90095	kmckinnon@ucla.edu +1 310 794 5452 https://karenamckinnon.github.io/
RESEARCH INTERESTS	My research focuses on quantifying, modeling, and understanding climate variability and change using data-driven physical and statistical models. My research interests include the continuum of climate variability, extreme weather events, land-atmosphere interactions, and the origin and implications of internal variability within the climate system.	
EDUCATION	Harvard University , Cambridge, MA Ph.D. in Earth and Planetary Science (2015) <i>Understanding and predicting temperature variability in the observational record</i> 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) <i>The Role of Climate and Bed Topography on the Evolution of the Tasman Glacier Since the Last Glacial Maximum</i> 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 Department of Statistics and Institute of the Environment and Sustainability Department of Atmospheric and Oceanic Sciences (2021 –) <i>Assistant Professor</i>	2018 –
	Descartes Labs , Santa Fe, NM <i>Applied Scientist</i>	2017 – 2018
	National Center for Atmospheric Research , Boulder, CO Division of Climate and Global Dynamics <i>Advanced Study Program post-doctoral fellow</i>	2015 – 2017
GRANTS AND FELLOWSHIPS	Packard Foundation DEI Pilot Grant: Undergraduate Research in Geosciences for UnderRepresented Groups, \$26,000	2022
	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 <i>The factors governing daily near-surface air temperature variability over land</i>	2020-2023

	NCAR Advanced Study Program Postdoctoral Fellowship <i>Bridging the weather-climate gap for extremes</i>	2015
	NSF Atmospheric and Geospace Sciences Postdoctoral Fellowship (declined)	2015
	NASA Earth and Space Science Fellowship <i>An examination of Earth's seasonal heat budget</i>	2014
	NSF Graduate Research Fellowship <i>The climate sensitivity continuum</i>	2011
	Harvard Smith Family Graduate Fellowship	2011
AWARDS	Editors' Citation for Excellence in Refereeing for Geophysical Research Letters	2016
	Derek Bok Center Certificate of Distinction in Teaching	2011
PUBLICATIONS	*indicates graduate student first author **indicates post-doc first author	
<i>Under review</i>	*Baugh, S., and K.A. McKinnon . Bayesian Quantification of Covariance Matrix Estimation Uncertainty in Optimal Fingerprinting. Under review in <i>Climate Dynamics</i> . Román-Palacios, C., H.M. Carroll, A.J. Arnold, R.J. Flores, S.V. Petersen, K.A. McKinnon , and A. Tripathi. BayClump: Bayesian Calibration and Temperature Reconstructions for Clumped Isotope Thermometry. Under review in <i>Geochemistry, Geophysics, Geosystems</i> .	
2022	33. McKinnon, K.A. , and I.R. Simpson, 2022. How unexpected was the 2021 Pacific Northwest heatwave?. <i>Geophysical Research Letters</i> , doi:10.1029/2022GL100380. 32. **Kong, W., K.A. McKinnon , I.R. Simpson, and M.M. Laguë, 2022. Understanding responses of summer continental daily temperature variance to perturbations in the land surface evaporative resistance. <i>Journal of Climate</i> , doi:10.1175/JCLI-D-21-1011.1. 31. *Horowitz, R.L., K.A. McKinnon , and I.R. Simpson, 2022. Circulation and Soil Moisture Contributions to United States Heatwaves. <i>Journal of Climate</i> , 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 (CO ₂) flux. <i>Global Biogeochemical Cycles</i> , doi:10.1029/2021GB007174. McKinnon, K.A. , 2022. Discussion on "A combined estimate of global temperature". <i>Environmetrics</i> , doi:10.1002/env.2721. (<i>Invited commentary, not peer reviewed.</i>) 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. <i>Journal of Advances in Modeling Earth Systems</i> , 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. <i>Proceedings of the National Academy of Sciences</i> , doi:10.1073/pnas.2114069119. 27. *Baugh, S., and K.A. McKinnon , 2022. Hierarchical Bayesian Modeling of Ocean Heat Content and Its Uncertainty. <i>Annals of Applied Statistics</i> , 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:10.1029/2020GB006921.
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)
- Introduction to Environmental Science (Winter quarter 2022)
- Advanced Climate Dynamics Course lecturer (Summer 2019)
- Modern Environmental Statistics (Winter quarter 2019, Spring quarter 2022)
- IoES Senior Practicum (Winter-Spring 2019)
- Teaching assistant: Global warming debates; The fluid earth: Oceans, Atmosphere, Climate, and Environment; Ordinary and partial differential equations; Introduction to Functions and Calculus (all courses at Harvard University)

INVITED
PRESENTATIONS

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, Tucson, 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.

CONTRIBUTED
PRESENTATIONS

“Observational Large Ensembles as tools to assess climate variability”, Talk, US CLIVAR Large Ensembles workshop, July 2019.

“The changing nature of summer heat: observed trends in humidity distributions”, Poster, Columbia University Correlated Extremes workshop, May 2019.

“Regional climate variability and the Observational Large Ensemble”, Talk, AGU Fall Meeting, December 2018.

“Observational constraints on the contribution of internal variability to recent climate trends”, Talk, Climate Variability and Change Working Group meeting, March 2017.

“Subseasonal predictions of Eastern US hot weather: the roles of the ocean and land”, Poster, AGU Fall Meeting, December 2016.

“The changing shape of summer temperature distributions”, Talk, NCAR CESM workshop, June 2016.

“Changes in the shape of summer temperature distributions and the probability of extremes”, Talk, Climate Variability and Change Working Group meeting, February 2016.

“Changes in the Full Distribution of Daily Temperatures with Implications for Extreme Events”, Poster, AGU Fall Meeting, December 2015.

“Understanding and predicting temperature variability in the observational record”, PhD defense, Harvard University, May 2015.

“Quantifying and predicting extremes in Eastern US temperature”, Poster, AGU Fall Meeting, December 2014.

“The relationship between Pacific SSTs and Northeastern US heat waves”, Talk, 4th Interna-

tional Workshop on Climate Informatics, September 2014.

“Feedback strengths estimated from observations at seasonal and decadal timescales”, Talk, AGU Fall Meeting, December 2013.

“On oceanic influence and surface temperature variability and change: from the seasonal cycle to transient warming”, Talk, Graduate Climate Conference, November 2013.

“The spatial pattern of temperature change”, Talk, AGU Fall Meeting, December 2012.

“The fingerprint of ocean influence on seasonal and interannual temperature change”, Poster, Third Santa Fe Conference on Global and Regional Climate Change, October 2011.

“Tasman Glacier, New Zealand: LGM climate reconstructions and bed overdeepenings”, Talk, INQUA Conference, July 2011.

“Climatic and non-climatic influences on the Tasman Glacier extent”, Talk, Snow and Ice Research Group Annual Meeting, February 2011.

“Are we loading the dice? Climate change and the 2001 Pacific Northwest Drought”, Talk, AGU Fall Meeting, December 2009.

OTHER PRESENTATIONS

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.

Science in the News public lecture series, Boston, MA, November 2013.

WORKSHOP PARTICIPATION

Invited participant in the CLIVAR “Towards more reliable regional climate change projections” workshop, Virtual, June 2021.

Invited participant in the San Francisco Public Utilities Commission Climate Information workshop, 2019.

Statistical Methods for Atmospheric and Oceanic Sciences (STATMOS)/Statistical and Applied Mathematical Sciences Institute (SAMSI) Workshop on Climate Statistics, NCAR, August 2017.

Rosbypalooza (Climate meets statistics), University of Chicago, July 2016.

LEADERSHIP AND AND SERVICE

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–

Member of Cervest Climate Intelligence Council, 2021–

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

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

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

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

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 US CLIVAR Large Ensemble working group, 2018–2021.

UCLA Center for Diverse Leadership in Science faculty fellow, 2018–

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

Reviewer for the National Science Foundation, *Nature*, *Science*, *Nature Geoscience*, *Nature Climate Change*, *Nature Communications*, *npj Climate and Atmospheric Science*, *GRL*, *Journal of Climate*, *Climate Dynamics*, *Climatic Change*, *BAMS*, *Weather and Climate Extremes*, *JAMES*, *Atmospheric Research*, *Atmospheric Science Letters*, *Nonlinear Processes in Geophysics*

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