Karen Aline McKinnon

Contact Information

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https://karenamckinnon.github.io/

Research interests

My research focuses on quantifying and understanding climate variability at a regional scale, with a focus on extreme events. My recent work is on the interaction between natural variability and forced climate change, summer midlatitude teleconnections in models and observations, and the physical and dynamical controls on daily temperature distributions.

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)

Harvard University, Cambridge, MA

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

Appointments

Descartes Labs, Santa Fe, NM **2017 –**
Applied Scientist

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

Harvard University, Cambridge, MA **2015**
Department of Earth and Planetary Science
Post-doctoral fellow

Grants and fellowships

NCAR Advanced Study Program Postdoctoral Fellowship **2015**
Bridging the weather-climate gap for extremes

NSF Atmospheric and Geospace Sciences Postdoctoral Fellowship (declined) **2015**

NASA Earth and Space Science Fellowship **2014**
An examination of Earth's seasonal heat budget

NSF Graduate Research Fellowship **2011**
The climate sensitivity continuum

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

McKinnon, K.A. and C. Deser. Internal variability and regional climate trends in the Observational Large Ensemble. Under review in *Journal of Climate*.

Deser, C., I. Simpson, A. Phillips, and **K.A. McKinnon**. How well do we know ENSO?s climate impacts over North America, and how do we evaluate models accordingly?. Under review in *Journal of Climate*.

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

Deser, C., I. Simpson, **K.A. McKinnon**, and A. Phillips. The Northern Hemisphere extratropical 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.

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.

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

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.

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.

- Media coverage including the New York Times, Associated Press, BBC, PBS, Climate Central, Christian Science Monitor, Weather Channel, Fox News

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.

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.

- Featured research article

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.

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.

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.

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.

Patent Applications

Hoyer, S. and **K.A. McKinnon**, Estimating temperature values at field level based on less granular data, U.S. Patent Application No. 14/640.900, filed March 3, 2016.

Mentoring and teaching

- Undergraduate mentoring: Pedro Brea (NCAR SOARS program), Manuela Mejia (CU Boulder), Ariana Varuolo-Clarke (NCAR SOARS program)
- 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)

Leadership and service

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

AGU 2015 session convener: 'Characterizing and interpreting changes in temperature and precipitation extremes'

AGU 2014 session co-convener: 'Quantifying Changes in Temperature Distributions'

Invited talks

"Observational constraints on the contribution of internal variability to climate trends", NCAR CESM tutorial, Boulder, CO, August 2017.

"The signal and the noise: forced and unforced changes in temperature distributions and the probability of extremes", American Physical Society Annual Meeting, New Orleans, LA, March 2017.

"Sources of subseasonal predictability of Eastern US summer temperatures", COLA lecture series, George Mason University, July 2016.

"Forced and unforced changes in the shape of summer temperature distributions", Uncertainty and Causality Assessment in Modeling Extreme and Rare Events workshop, NCAR, April 2016.

"Predicting summer extremes", Data analysis and extremes workshop, Harvard University, April 2016.

"Daily temperature distributions and the probability of extremes", International Detection and Attribution Group meeting, NCAR, February 2016.

"Subseasonal predictions of Eastern US hot days from the mid-latitude Pacific", Institute for Mathematics Applied to Geosciences (IMAGe) Seminar, NCAR, January 2016.

"Foretelling Eastern US heat events from the mid-latitude Pacific", MIT Sack Lunch Seminar, December 2014.

Academic presentations

"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 International 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

"Long lead predictions of Eastern United States hot weather", Foothills Kiwanis Club of Boulder, September 2016.

"Extreme weather: causes, effects, and connections with climate", Science in the News public lecture series, November 2013.

Community activities

Advanced Study Program seminar series organizer

NCAR SOARS Mentor

Front Range Geoscience Mentor (PROGRESS)

Co-founder, Harvard-MIT Women in Climate

Collaborators

Peter Huybers and Natesh Pillai (Harvard), Clara Deser and Isla Simpson (NCAR), Andrew Poppick (Carleton College), Cecilia Bitz (University of Washington), Brian Anderson (Victoria University of Wellington), Alexander Stine (San Francisco State University), Phil Mote (Oregon State University), Martin Tingley and Andrew Rhines (Netflix), Nathan Mueller (UC Irvine), Marlene Kretschmer (PIK)