MARIE C. MCGRAW, PH.D.

Postdoctoral Research Associate, Department of Atmospheric Science ⋄ University of Washington, Seattle, WA

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EDUCATION

Ph.D., Atmospheric Science, Colorado State University, Fort Collins, CO — March 2019
Advisor: Elizabeth A. Barnes

M.S., Atmospheric Science, Colorado State University, Fort Collins, CO — October 2015
Advisor: Elizabeth A. Barnes

B.Sc., Mechanical Engineering, Massachusetts Inst. of Technology, Cambridge, MA — June 2012

SKILLS AND TRAINING

Research expertise: Large scale atmospheric and climate dynamics, statistical and data science methods for atmospheric science, sea ice predictability and variability

Programming: Python (including scipy, pandas, xarray, scikit-learn, statsmodels, matplotlib, seaborn, cartopy and Jupyter notebooks), MATLAB; familiarity with Fortran, NCAR Command Language; git

Data Analysis: Experienced with large geospatial datasets, including coupled climate and weather model output, ensemble prediction systems, reanalysis, and satellite observations; experienced with statistical modeling and data science analyses for atmospheric science, including Bayesian causal inference, probabilistic graphical modeling, and vector autoregressive models.

PROFESSIONAL EXPERIENCE

Postdoctoral Research Associate, University of Washington, Seattle, WA — June 2019 - Present

- Performed extensive statistical analysis of large geospatial data sets, including output from weather forecasting models and satellite observations, with a focus on predictability and extreme events.
- Developed open-source Python code to be shared with the scientific community.
- Attended scientific workshops, conferences, and hackathons to share scientific results and learn new analysis techniques.

Graduate Research Assistant, Colorado State University, Fort Collins, CO — June 2013 - May 2019

- Performed extensive numerical and statistical analysis of large geospatial datasets, including climate model output, and led 3 peer-reviewed publications with a statistical and data analysis focus.
- Applied time series forecasting methods from econometrics (Granger causality) and Bayesian causal inference algorithms to climate variability and change analysis.
- Collaborated extensively with computer science researchers, including interdisciplinary publications applying causal discovery methods to climate science; a spotlight presentation at a climate informatics workshop, and publicly shared code.

SELECT PUBLICATIONS

UNDER REVIEW (3 total)

McGraw, M.C., E. Blanchard-Wrigglesworth, R.P. Clancy, and C.M. Bitz: Understanding the predictability of Arctic sea ice loss on subseasonal timescales. submitted to *Journal of Climate* 04/2021.

PUBLISHED (8 total)

McGraw, M.C. and E.A. Barnes (2020): New Insights on Subseasonal Arctic-Midlatitude Causal Connections from a Regularized Regression Model. *Journal of Climate*, doi:10.1175/JCLI-D-19-0142.1.

Samarasinghe, S., **M.C. McGraw**, E.A. Barnes, and I. Ebert-Uphoff (2019): A study of links between the Arctic and the midlatitude jet-streams using Granger and Pearl causality. *Environmetrics,* doi:10.1002/env.2540.

McGraw, M.C., and E.A. Barnes (2018): Memory matters: A case for Granger causality in climate variability studies. *J. Climate*, **31,** doi:10.1175/JCLI-D-17-0334.1.

McGraw, M.C., and E.A. Barnes (2016): Seasonal sensitivity of the eddy-driven jet to tropospheric heating in an idealized AGCM. *J. Climate*, **29,** doi:10.1175/JCLI-D-15-0723.1.

SELECTED PRESENTATIONS (5 OF 14)

McGraw, M.C., E Blanchard-Wrigglesworth, RP Clancy, CM Bitz: Extreme Sea Ice Loss on Subseasonal Timescales in S2S Forecast Models. Poster presentation: American Geophyiscal Union Annual Meeting, 12/2020 (remote).

McGraw, M.C., and E.A. Barnes: Using Causal Discovery to Explore Arctic-Midlatitude Dynamics. Oral presentation: American Geophysical Union Annual Meeting, Washington, DC (12/2018); NCAR Climate Variability and Change weekly seminar, Boulder, CO (11/2018); Atmospheric Dynamics seminar, University of Washington, Seattle, WA (11/2019).

Samarasinghe, S., **M. C. McGraw**, E. A. Barnes, and I. Ebert-Uphoff: A Study of Causal Links Between the Arctic and the Midlatitude Jet-Streams. **Spotlight presentation (with Savini Samarasinghe):** 7th International Workshop on Climate Informatics, Boulder, CO. 09/2017.

McGraw, M. C., and E. A. Barnes: Comparing the Forced Response to Volcanic Eruptions Against Internal Variability in Climate Models. Oral presentation: SPARC DynVAR Workshop, Helsinki, Finland (06/2016); NCAR Climate Variability and Change Working Group Meeting, Boulder, CO (02/2016).

McGraw, M. C., and E. A. Barnes: Seasonal sensitivity of the eddy-driven jet to tropospheric heating in an idealized AGCM. Poster: SPARC Storm Tracks Workshop, Grindelwald, Switzerland. 08/2015.

TEACHING AND MENTORING

Graduate Teaching Assistant for two graduate-level classes involving helping students complete theoretical and numerical analysis of weather and climate problems, and developing independent projects
Mentor in summer 2014 to an undergraduate who is currently pursuing her Ph.D. at U. Wisconsin

PROFESSIONAL ORGANIZATIONS AND OUTREACH

Member, American Geophysical Union (2014-present), American Meteorological Society (2014-present), Graduate Women in Science (2015-2019)

Reviewer for *Journal of Climate*, *Journal of Geophysical Research: Atmospheres*, *Geophysical Research Letters*, *Nature Climate Change*, *Earth System Dynamics*, *Weather and Climate Dynamics*

Member, U. Washington Atmospheric Sciences Diversity and Inclusion working group; U. Washington Atmospheric Sciences Colloquium Committee (postdoc representative)