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Marc J. Alessi

Research Interests
■ Climate Sensitivity and Attribution ■ Climate Machine Learning ■ Drought Prediction ■ Statistical Post-Processing ■ Extreme Weather

📚 Education

Colorado State University, Fort Collins, CO
Ph.D. Candidate, Atmospheric Science, May 2024 (expected)

Cornell University, Ithaca, NY
M.Sc., Atmospheric Science, August 2020

Cornell University, Ithaca, NY
B.Sc., Atmospheric Science, May 2018
Cum Laude with Distinction in Research

Jacobs University, Bremen, Germany
College of Agriculture and Life Sciences Student Exchange Program, Spring 2016

📄 Publications

[10] **Alessi, M. J.,** Rugenstein, M. A., 2024: Potential near-term wetting of the Southwestern United States if the Eastern and Central Pacific cooling trend reverses. *Submitted.*

[9] Bloch-Johnson, J., Rugenstein, M. A. A., **Alessi, M. J.,** Proistosescu, C., Zhao, M., Zhang, B., Williams, A. I. L., Gregory, J. M., Cole, J., Dong, Y., Duffy, M. L., Kang, S. M., and Zhou, C., 2024: The Green's Function Model Intercomparison Project (GFMIP) Protocol. *Journal of Advances in Modeling Earth Systems.* doi: 10.1029/2023MS003700

[8] **Alessi, M. J.,** Rugenstein, M. A., 2023: Surface temperature pattern scenarios suggest higher warming rates than current projections. *Geophysical Research Letters.* doi: 10.1029/2023GL105795

[7] Herrera, D. A., Cook, B. I., Fasullo, J., Anchukaitis, K. J., **Alessi, M. J.,** Martinez, C. J., et al. 2023: Observed changes in hydroclimate attributed to human forcing. *PLOS Climate.* doi: 10.1371/journal.pclm.0000303

[6] Evans, C. P., Ault, T. R., Coats, S., Carrillo, C. M., Li, X., **Alessi, M. J.**, Herrera, D. A., and Benton, B. N., 2022: Intrinsic century-scale variability in tropical Pacific sea surface temperatures and their influence on southwestern US hydroclimate. *Geophysical Research Letters.* doi: 10.1029/2022GL099770

[5] **Alessi, M. J.,** Herrera, D. A., Evans, C. P., DeGaetano, A. T., Ault, T. R., 2022: Soil Moisture Conditions Determine Land-Atmosphere Coupling and Drought Risk in the Northeastern United States. *Journal of Geophysical Research: Atmospheres.* doi: 10.1029/2021JD034740

[4] Benton, B. N., **Alessi, M. J.**, Herrera, D., Li, X., Carrillo, C. M., and Ault, T. R., 2019: Minor Impacts of Major Volcanic Eruptions on Hurricanes in Dynamically Downscaled Last Millennium Simulations. *Climate Dynamics.* doi: 10.1007/s00382-021-06057-4

[3] **Alessi, M. J**. and DeGaetano, A. T., 2021: A comparison of statistical and dynamical downscaling methods for short-term weather forecasts in the US Northeast. *Meteorol Appl.* doi: 10.1002/met.1976

[2] Herrera, D. A., Ault, T. R., Carrillo, C. M., Fasullo, J. T., Li, X., Evans, C. P., **Alessi, M. J.,** and Mahowald, N. M., 2020: Dynamical Characteristics of Drought in the Caribbean from Observations and Simulations. *J. Climate.* doi: 10.1175/JCLI-D-20-0100.1.

[1] **Alessi, M. J**. and DeGaetano, A. T., 2020: Future Extreme Hourly Wet Bulb Temperatures Using Downscaled Climate Model Projections of Temperature and Relative Humidity. *Theor Appl Climatol.* doi: 10.1007/s00704-020-03368-0.

🎙 Oral Presentations

[6] **Alessi, M. J.** and Rugenstein, M. A. A. Accounting for uncertainty of projected SST patterns in coupled global circulation models. *Max Planck Institute for Meteorology Joint Seminar*, August 2022

[5] **Alessi, M. J.** and Rugenstein, M. A. A. Accounting for uncertainty of projected SST patterns in coupled global circulation models. *Equilibrium Climate Sensitivity Symposium Lightning Talk*, January 2022

[4] **Alessi, M. J.**, Herrera, D. A., Evans, C. P., DeGaetano, A. T., Ault, T. R. Soil Moisture Conditions Determine Land-Atmosphere Coupling and Drought Risk in the Northeastern United States. *American Meteorological Society 35th Hydrology Conference Session on Advancements in Analysis and Prediction of Drought*, virtual, January 2022

[3] **Alessi, M. J.** and Rugenstein, M. A. A. Accounting for uncertainty of projected SST patterns in coupled climate models. *14th ECS & Cloud Feedback Virtual Symposia*, January 2022

[2] **Alessi, M. J.**, DeGaetano, A. T., Ault, T. R. Identifying a Soil Moisture-Rainfall Feedback in the 2016 New York Summer Drought. *American Meteorological Society 33rd Hydrology Conference Session on Understanding Land-Atmosphere Interactions*, Phoenix, AZ, January 2019

[1] **Alessi, M. J.**, DeGaetano, A. T., Ault, T. R. Identifying a Soil Moisture-Rainfall Feedback in the 2016 New York Summer Drought. *Earth and Atmospheric Science Undergraduate Research Symposium,* Cornell University, Ithaca, NY, May 2018

🎨 Poster Presentations

[8] **Alessi, M. J.** and Rugenstein, M. A. A. Relevance of Pacific sea surface temperature patterns for Western North American precipitation trends. *Cloud Feedback Model Intercomparison Project 2023*, Paris, France, July 2023

[7] **Alessi, M. J.** and Rugenstein, M. A. A. Relevance of the Pattern Effect for Temperature Projections. *The Pattern Effect Workshop*, Boulder, CO, May 2022

[6] **Alessi, M. J.** and Rugenstein, M. A. A. Relevance of the Pattern Effect for Temperature Projections. *Cloud Feedback Model Intercomparison Project 2021 Virtual Meeting*, September 2021

[5] **Alessi, M. J.** and DeGaetano, A. T. Forecast Skill of Varying WRF Resolutions and Physics Parameterization Combinations over the Finger Lakes and Long Island with Statistical Post-Processing. *American Meteorological Society 26th Conference on Numerical Weather Prediction*, Boston, MA, January 2020

[4] **Alessi, M. J.**, DeGaetano, A. T., Ault, T. R. Identifying a Soil Moisture-Rainfall Feedback in the 2016 New York Summer Drought. *American Meteorological Society 33rd Hydrology Conference Session on Understanding Land-Atmosphere Interactions*, Phoenix, AZ, January 2019 (presented as both poster and talk)

[3] **Alessi, M. J.**, DeGaetano, A. T. Identifying a Trend in Historical and Modeled Wet-bulb. *American Meteorological Society 24th Conference on Applied Climatology,* Phoenix, AZ, January 2019

[2] **Alessi, M. J.**, DeGaetano, A. T., Ault, T. R. Modeling the Effects of Soil Moisture on the 2016 New York Summer Drought. *American Meteorological Society Student Conference Poster Session*, Austin, TX, January 2018

[1] **Alessi, M. J.**, DeGaetano, A. T., Ault, T. R. Modeling the Effects of Soil Moisture on Intense Precipitation Events in the Northeast. *Water Resources Institute Summer Intern Poster Symposium,* Cornell University, Ithaca, NY, August 2017

♈ Awards, Honors, and Grants

2023-2024 [Vice President for Research Graduate Fellowship](#)
    Colorado State University, Fort Collins, Colorado

2022 German Academic Exchange Service (DAAD) Research Scholarship
    Max Planck Institute of Meteorology, Hamburg, Germany, Summer 2022

2020 Walter Scott, Jr. Graduate Fellowship
    Walter Scott, Jr. College of Engineering, Colorado State University, August 2020

2018 Father James B. Macelwane Award for top undergraduate research thesis
    American Meteorological Society, January 2019

Travel Award for 98th Annual American Meteorological Society Conference
    American Meteorological Society, January 2018

Cornell Student Delegate to UNFCCC COP 23 in Bonn, Germany
    Cornell Institute for Climate Smart Solutions, Atkinson Center for a Sustainable
    Future, Engaged Cornell, Fall 2017

2017 "I am the Strength Behind the National Ataxia Foundation" Award
    National Ataxia Foundation (NAF), Spring 2017
    Directed and organized an annual fundraiser in memory of my father called
    "Walk for Dave." Over $35,000 raised for the NAF over five years

2017 Fuerst Outstanding Library Student Employee
    Cornell University Library, Spring 2017

Brian Bosart '96 Scholarship (awarded to one promising atmospheric science junior)
    The Bosart Family, Fall 2016

⊕ Scientific Research Experience

Graduate Research Assistant   Fall 2020 - Present
Colorado State University, Fort Collins, CO
    Advisor: Dr. Maria Rugenstein, Atmospheric Science, Colorado State University

Graduate Research Assistant   Fall 2018 – Summer 2020
Cornell University, Ithaca, NY
    Advisors: Dr. Arthur T. DeGaetano and Dr. Toby R. Ault, Earth and Atmospheric
    Sciences, Cornell University
    Thesis: *Statistical Post-Processing of Ensemble WRF Forecasts for Microclimatic*
    Regions in the U.S. Northeast

Research Assistant   Summer 2018, Summer 2016
Northeast Regional Climate Center, Ithaca, NY

Undergraduate Research Assistant Summer 2017

NY State Water Resources Institute, Cornell University, Ithaca, NY

Teaching Experience

Lead Teaching Assistant/Guest Lecturer Spring 2022, 2023

Colorado State University, Fort Collins, CO

Introduction to Climate (ATS 606). Led student project in developing a radiative convective equilibrium model in python, complete with an ocean and radiative feedbacks. Taught several classes on land-atmosphere interaction and radiative feedbacks.

Guest Lecturer Fall 2019

Cornell University, Ithaca, NY

Climate Dynamics Lecture (EAS 3050). Taught lecture on eddy circulations and meridional transport (water/energy fluxes), and large-scale circulation patterns (e.g. monsoons)

Lead Teaching Assistant Spring 2019

Cornell University, Ithaca, NY

Climate Change and Global Warming (EAS 2680). Graded assignments/exams, held weekly office hours, and proctored exams

Lead Teaching Assistant/Guest Lecturer Fall 2017

Cornell University, Ithaca, NY

Basic Principles of Meteorology Lab (EAS 1330). Prepared and taught each lab with PowerPoint presentation, graded labs, developed final exam

Teaching Assistant Fall 2016

Cornell University, Ithaca, NY

Basic Principles of Meteorology Lab (EAS 1330). Prepared and taught each lab with PowerPoint presentation, graded labs, developed final exam

Technical Skills

Programming: Python, MATLAB, R, Fortran, NCL, LATEX, Vim, Unix, bash, tcsh

Modeling: WRF, ECHAM (MPI-ESM atmosphere), NCAR/UCAR CISL Cheyenne, MPI Levante/Mistral

Tools/Experience: Git, Amazon Web Services, Scikit-learn

✈ Professional Travel

Workshops:
The Pattern Effect Workshop, Boulder, CO, May 2022
2nd International Center for Theoretical Physics Summer School on Theory, Mechanisms and Hierarchical Modeling of Climate Dynamics: Convective Organization and Climate Sensitivity, Trieste, Italy, Jul. 2019

Field Research:
Climate Change Awareness and Service Learning in the Mekong Delta, Vietnam, Jan. 2017

Conferences:
American Geophysical Union Annual Meeting, San Francisco, CA, Dec. 2023
Cloud Feedback Model Intercomparison Project Conference, Paris, France, Jul. 2023
Tropical tropospheric temperature lapse rate Conference, Paris, France, Jul. 2023
Cloud Feedback Model Intercomparison Project Conference, Virtual Meeting, Jan. 2021
100th American Meteorological Society Annual Meeting, Boston, MA, Jan. 2020
99th American Meteorological Society Annual Meeting, Phoenix, AZ, Jan. 2019
43rd Annual Northeastern Storm Conference, Saratoga Springs, NY, Mar. 2018
98th American Meteorological Society Annual Meeting, Austin, TX, Jan. 2018
8th Annual Great Lakes Atmospheric Science Symposium, Oswego, NY, Oct. 2018
97th American Meteorological Society Annual Meeting, Seattle, WA, Jan. 2017
40th Annual Northeastern Storm Conference, Saratoga Springs, NY, Mar. 2015

▤ Professional Activities and Service

Peer Reviewer, Geophysical Research Letters (2022-), Environmental Research Letters (2023-), Journal of Climate (2023-), Theoretical and Applied Climatology (2023-), Scientific Reports (2022-)
ATS/CIRA Diversity, Equity, Inclusion Committee, Colorado State University, Department of Atmospheric Science, 2023-present
Anti-Racism Book Club Organizer, Colorado State University, Department of Atmospheric Science, 2020-present
WxChallenge Team Manager, Colorado State University, Department of Atmospheric Science, 2020-present
Graduate Student Representative, Colorado State University, Department of Atmospheric Science, 2021-2023
Graduate Student Council Representative, Colorado State University, 2020-2023
Co-President of the Cornell Chapter of the American Meteorological Society, Cornell University, Earth and Atmospheric Science Department, 2017-2018

🌐 Personal Interests

Traveling, playing the piano and cello, studying history, hiking, chasing severe storms, hurricane forecasting, reading