

# Arianna M. Varuolo-Clarke

NOAA Climate & Global Change Postdoctoral Fellow  
University of Colorado, Boulder

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## Academic Appointments

### University of Colorado

Boulder, CO

NOAA Climate & Global Change Postdoctoral Fellow

September 2023-present

Advisor: Jennifer E. Kay

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## Education

### Ph.D. Columbia University

New York, NY

Earth & Environmental Sciences

2023

Dissertation: The mystery of observed and simulated precipitation trends in Southeastern South America since the early 20<sup>th</sup> century

Advisors: Jason E. Smerdon & A. Park Williams

M.Phil. (2021), M.A. (2020)

### M.S. Stony Brook University

Stony Brook, NY

Atmospheric Sciences

2018

Thesis: Topographic influences on the North American monsoon

Advisor: Kevin A. Reed

### B.A. Vermont State University, Lyndon

Lyndonville, VT

Atmospheric Science

2016

*Formerly Lyndon State College (LSC)*

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## Research Experience

### Graduate Research Assistant

2018-2023

Lamont-Doherty Earth Observatory of Columbia University, New York, NY

### Graduate Research Assistant

2016-2018

School of Marine and Atmospheric Science, Stony Brook University, Stony Brook, NY

**Significant Opportunities in Atmospheric Research and Science (SOARS)** Summers 2014-2017

### Undergraduate Research Assistant

2013

Atmospheric Science Department, Lyndon State College, Lyndonville, VT

## Peer-Reviewed Publications

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Under Review. Williams AP, McKinnon KA, Anchukaitis KJ, Gershunov A, **Varuolo-Clarke AM**, Clemesha RES, Liu H. Anthropogenic influence on extreme cool-season precipitation has not yet emerged across the western United States. *JGR–Atmospheres*

In revision. **Varuolo-Clarke AM**, Smerdon JE, Williams AP. Jet dynamics do not explain climate model simulations of muted multidecadal summer precipitation trends in Southeastern South America. *Geophysical Research Letters*.

[9] In press. Williams AP, Anchukaitis KJ, Varuolo-Clarke AM. Atmospheric rivers are responsible for cyclicity in Sierra Nevada precipitation. *Journal of Climate*, <https://doi.org/10.1175/JCLI-D-23-0421.1>

[8] 2023. Rao, MP, Davi, NK, Magney, TS, Andreu-Hayles, L, Baatarbileg, N, Suran, B, **Varuolo-Clarke, AM**, Cook, BI, D'Arrigo, RD, Pederson, N, Odrentsen, L, Rodríguez-Catón, M, Leland, C, Griffin, KL. Rapidly approaching a thermal tolerance tipping point in the Eurasian boreal forest at its southern margins. *Communications Earth & Environment*, <https://doi.org/10.1038/s43247-023-00910-6>

[7] 2022. Cook, BI, JE Smerdon, ER Cook, AP Williams, KJ Anchukaitis, JS Mankin, K Allen, L Andreu-Hayles, TR Ault, S Belmecheri, S Coats, B Coulthard, B Fosu, P Grierson, D Griffin, DA Herrera, M Ionita, F Lehner, C Leland, K Marvel, MS Morales, V Mishra, J Ngoma, HTT Nguyen, A O'Donnell, J Palmer, MP Rao, M Rodriguez-Caton, R Seager, DW Stahle, S Stevenson, UK Thapa, **AM Varuolo-Clarke**, EK Wise. Megadroughts in the Common Era and the Anthropocene. *Nat. Rev. Earth Environ.*, <https://doi.org/10.1038/s43017-022-00329-1>

[6] 2022. **Varuolo-Clarke, AM**, Williams, AP, Smerdon, JE, Ting, M., Bishop, DA. Influence of the South American low-level jet on the austral summer precipitation trend in southeastern South America. *Geophysical Research Letters*, <https://doi.org/10.1029/2021GL096409>

[5] 2022. Williams AP, Livneh B, McKinnon KA, Hansen WD, Mankin JS, Cook BI, Smerdon JE, **Varuolo-Clarke AM**, Bjarke NR, Juang CS, Lettenmaier DP. Growing impact of wildfire on western United States water supply. *Proceedings of the National Academy of Sciences USA*, <https://doi.org/10.1073/pnas.2114069119>

[4] 2022. Rodriguez-Caton M, Andreu-Hayles L, Daux V, Vuille M, **Varuolo-Clarke AM**, Oelkers R, Christie DA, D'Arrigo R, Morales MS, Palat Rao M, Srur AM, Vimeux F, Villalba R. Hydroclimate and ENSO Variability Recorded by Oxygen Isotopes from Tree Rings in the South American Altiplano. *Geophysical Research Letters*, <https://doi.org/10.1029/2021GL095883>

[3] 2021. Steiger NJ, Smerdon JE, Williams AP, Seager R, **Varuolo-Clarke AM**. Coupled megadrought risk in North and South America. *Nature Geoscience*, <https://doi.org/10.1038/s41561-021-00819-9>

- [2] 2021. **Varuolo-Clarke AM**, Smerdon JE, Williams AP, Seager R. Gross discrepancies between observed and simulated 20<sup>th</sup> to 21<sup>st</sup>-century precipitation trends in Southeastern South America. *Journal of Climate*, 34, 6441-6457, <https://doi.org/10.1175/JCLI-D-20-0746.1>
- [1] 2019. **Varuolo-Clarke, AM**, Reed K A, Medeiros, B. Characterizing the North American Monsoon in the Community Atmosphere Model: Sensitivity to Resolution and Topography. *Journal of Climate*, <https://doi.org/10.1175/JCLI-D-18-0567.1>

## Presentations (first author and presenter)

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Varuolo-Clarke, A., Smerdon, J.E., Williams, A.P., 2023: **Jet dynamics do not explain climate model simulations of muted multidecadal summer precipitation trends in southeastern South America**. American Geophysical Union, Annual Meeting 2023, *Climate Change, Variability, and Impacts in South America*, San Francisco, CA.

Varuolo-Clarke, A., Smerdon, J.E., Williams, A.P., 2023: **The mystery of multidecadal precipitation trends in Southeastern South America**. CFMIP-GASS Conference on *Clouds, Precipitation, Circulation and Climate Sensitivity*, Paris, France.

Varuolo-Clarke, A., Smerdon, J.E., Williams, A.P., 2022: **Low-level jet dynamics simulated by CMIP6 models don't account for their muted estimates of 20th-century precipitation trends in Southeastern South America**. American Geophysical Union, Annual Meeting 2022, *Advancing Research on the Hydroclimate of South America and the Caribbean*, Chicago, IL.

Varuolo-Clarke, A., Williams, A.P., Smerdon, J.E., 2021: **Intensified low-level jet and increased humidity drove nearly half of the large wetting trend in Southeastern South America**. American Geophysical Union, Annual Meeting 2021, *Changes and Impacts of Climate Variability in South America*, New Orleans, LA.

Varuolo-Clarke, A., Smerdon, J.E., Williams, A.P., 2020: **Gross discrepancies between observed and simulated secular precipitation trends over the 20th-21st centuries in Southeastern South America**. American Geophysical Union, Annual Meeting 2020, *CMIP6 Climate Model Evaluation*, Virtual Meeting.

Varuolo-Clarke, A., Smerdon, J.E., Williams, A.P., 2019: **Investigating Opposing 20th-Century Precipitation Trends in Chile and Argentina using Observations and Models**. American Geophysical Union, Annual Meeting 2019, *Changes and Impacts of Climate Variability in South America*, San Francisco, CA.

Varuolo-Clarke, A., Smerdon, J.E., Williams, A.P., 2019: **Quantifying historical and future causes of hydroclimate variability in Chile and Argentina**. PIRE CREATE Annual Meeting, Sao Paulo, Brazil

Varuolo-Clarke, A., Reed, K.A., Medeiros, B., 2018: **Topographic Influences on the North American Monsoon**. American Geophysical Union, Annual Meeting 2018, *Monsoons: Observations, Subseasonal, Seasonal, and Interannual to Decadal Variability, Forecast, Climate Change, and Extremes*, Washington D.C.

Varuolo-Clarke, A., Reed, K.A., Medeiros, B., 2018: **Topographic Influences on the North American Monsoon in the Community Atmosphere Model**. WCRP Grand Challenge on Clouds, Circulation and Climate Sensitivity: 2<sup>nd</sup> Meeting on Monsoons and Tropical Rain Belts, Poster Session, Trieste, Italy.

Varuolo-Clarke, A., Reed, K.A., Medeiros, B., 2018: **Topographic Influences on the North American Monsoon in the Community Atmosphere Model**. 23<sup>rd</sup> Annual CESM Workshop, Poster Session, Boulder, CO.

Varuolo-Clarke, A., Medeiros, B., Reed, K.A., 2018: **Investigating the geographic controls of the North American Monsoon in the Community Atmosphere Model**. American Meteorological Society 33<sup>rd</sup> Conference on Hurricanes and Tropical Meteorology, Monsoon Oral Session, Ponte Vedra, FL.

Varuolo-Clarke, A., Medeiros, B., Reed, K.A., 2018: **Investigating the geographic controls of the North American Monsoon in the Community Atmosphere Model**. Northeastern Storm Conference, Oral Session, Saratoga Springs, NY.

Varuolo-Clarke, A., Medeiros, B., Reed, K.A., 2017: **Investigating the Influence of Topography on the Dynamics of the North American Monsoon in Climate Model Simulations**. Graduate Climate Conference Poster Session, Woods Hole, MA.

Varuolo-Clarke, A., Medeiros, B., Reed, K.A., 2017: **Investigating the Influence of Topography on the Dynamics of the North American Monsoon in Climate Model Simulations**. SOARS Poster Session 2017, Boulder, CO.

Varuolo-Clarke, A., Medeiros, B., Reed, K.A., 2017: **Investigating the Influence of Topography on the Dynamics of the North American Monsoon in Climate Model Simulations**. SOARS Colloquium 2017, Boulder, CO.

Varuolo-Clarke, A., Medeiros, B., Reed, K.A., 2016: **What are the roles of air-sea coupling and resolution for the Northeast Pacific stratocumulus to cumulus transition in the Community Earth System Model?** American Geophysical Union, Annual Meeting Poster Session 2016, *Toward Reducing Systematic Errors in Weather and Climate Models: Evaluation, Understanding, and Improvement*, San Francisco, CA.

Varuolo-Clarke, A., Medeiros, B., 2016: **What are the roles of air-sea coupling and resolution for the Northeast Pacific stratocumulus to cumulus transition in the Community Earth System Model?** SOARS Poster Session 2016, Boulder, CO.



**Washington State University Upward Bound, Pullman, WA***Summer Academy Course Instructor*

Summer 2021

- Co-taught and co-developed a two week course on glaciers and climate change through a virtual expedition to the Juneau Icefield for high school students in the Upward Bound Program

**University of Maine, Orono, ME***Guest Lecture, "Introduction to Glaciology"*

Spring 2021

- Lectured about hydroclimate in South America and different paleoclimate proxies

**Borough of Manhattan Community College Upward Bound, New York, NY***Workshop Facilitator*

Spring 2021

- Co-taught and co-developed two workshops on climate, glaciers, and sea level change for the Upward Bound students at Borough of Manhattan Community College

**Stony Brook University, Stony Brook, NY***Guest Lecture, "Extreme Weather", ATM102.1/EST102.1*

Fall 2017

- Lectured on foundations of climate and weather

*Teaching Assistant, "Weather and Climate", ATM102.1/EST102.1*

Spring 2017

*Teaching Assistant, "Extreme Weather", ATM103.1*

Fall 2016

## Additional Experience

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**Pedagogies of Race and Oppression Learning Community**

Fall 2020

Columbia University, New York, NY

**PIRE CREATE Summer School on Paleoclimate Reconstruction from speleothems and tree-ring records**

July 20 – July 26, 2019

University of Sao Paulo, Sao Paulo, Brazil

**Summer School on Theory, Mechanisms and Hierarchical Modelling of Climate Dynamics: Multiple Equilibrium in the Climate System Participant**

June 25 – June 30, 2018

International Center for Theoretical Physics, Trieste, Italy

**AMS Summer Policy Colloquium Participant, Washington, DC**

June 3 – June 12, 2018

**Juneau Icefield Research Program (JIRP), Juneau, AK**

Summer 2015

Research – Juneau Icefield Research Program: Mass Balance of Taku and Lemon Creek Glaciers

Mentors – Dr. Matthew Beedle, Dr. Shad O'Neel

## Honors and Awards

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NOAA Climate &amp; Global Change Postdoctoral Fellowship

2023-2025

PEO Scholar Award Nomination

2021

Columbia University Provost's Diversity Fellowship	2018-2023
Columbia University's Dean's Fellowship	2018-2019
Maze-Landau Graduate Student Travel Award, Stony Brook University	2018
Stony Brook Dean's Scholarship	Fall 2016, Spring 2017
Dr. David L. Ferguson Merit Award	Fall 2016
LSC Alumni Outstanding Senior Award	Spring 2016
LSC Dean's List	Fall 2012, Spring 2013, Fall 2015, Spring 2016
AGU David J. Hoffman Award	September 2014
LSC Presidential Scholarship	2012-2014
LSC Scholar Award	2012-2015
LSC Promise Scholarship	2012-2015
LSC Honors Scholarship	February 2013
LSC Leadership Scholarship	February 2013
LSC T.N. Vail Endowment	February 2013

## Leadership and Service

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<b>Lamont Diversity, Equity, Inclusion &amp; Anti-bias Committee</b>	2021-2023
Lamont-Doherty Earth Observatory of Columbia University	
<b>Ocean and Climate Physics Division Seminar Committee</b>	2021-2022
Lamont-Doherty Earth Observatory of Columbia University	
<b>URGE Lamont Pod Organizer</b>	2021
Lamont-Doherty Earth Observatory of Columbia University	
<b>Climate Data Guide, Board of Advisors (inaugural member)</b>	2020-2022
National Center for Atmospheric Research, Boulder CO	
<ul style="list-style-type: none"> <li>• NSF-funded effort to grow, improve and diversify the Guide</li> </ul>	
<b>The Climate Consensus</b>	2020-2022
Northern Vermont University at Lyndon, Lyndonville VT	
<b>Diversity Co-Chair, Graduate Student Committee</b>	2020-2021
Lamont-Doherty Earth Observatory of Columbia University	
<b>Lamont-Doherty Earth Observatory Open House Volunteer</b>	2018-2019
<b>School of Marine and Atmospheric Science Graduate Club, Stony Brook, NY</b>	2017- 2018
<b>Executive Board of Beta Alpha Sigma Zeta</b>	2015-2016
Northern Vermont University at Lyndon, Lyndonville VT	
<b>Student Conference Planning Committee for National AMS</b>	Feb. 2015-May 2016

## Technical Skills

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**Models:** Community Earth System Model (CESM)

**Programming Languages:** Python, NCL, Matlab

**Operating Systems:** Mac, Windows, Linux, Unix

## Professional Affiliations

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National Association of Black Geoscientists	2021-present
American Geophysical Union	2014-present
American Meteorological Society	2014-present
Earth Science Women's Network	2014-present