

**Rick D. Russotto, Ph.D.**

New York City-based climate scientist and data scientist.

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### **POST-GRADUATE WORK EXPERIENCE**

**Gro Intelligence**, New York, NY:

*Climate Change Data Scientist*, June 2021 – March 2024

Climate team (reporting to Michael Simonetti),

Climate Science team (reporting to Maria Caffrey)

**Lamont-Doherty Earth Observatory, Columbia University**, Palisades, NY:

*Postdoctoral Research Scientist*, June 2018 – May 2021

Ocean and Climate Physics Division.

Advisors: Suzana Camargo and Adam Sobel (September 2020-May 2021),

Michela Biasutti (June 2018-August 2020)

### **EDUCATION**

**University of Washington**, Seattle, WA, USA

Ph.D.: Atmospheric Sciences, June 2018

- Dissertation: *Responses of the Climate System to Opposing Solar and CO<sub>2</sub> Forcings*
- Advisor: Thomas Ackerman

M.S.: Atmospheric Sciences, June 2015

- Thesis: *The Effects of Ice Crystal Shape on the Evolution of Optically Thin Cirrus Clouds in the Tropics*
- Advisors: Thomas Ackerman and Dale Durran

**Yale University**, New Haven, CT, USA

B.S. *summa cum laude*: Geology & Geophysics, May 2012

(Atmosphere, Ocean and Climate Dynamics track)

- Senior thesis: *Microphysical Modeling of Cloud Droplet Activation over Dominica*
- Advisor: Trude Storelvmo

**Deerfield Beach High School**, Deerfield Beach, FL, USA

International Baccalaureate Diploma, May 2008

### **PEER-REVIEWED PUBLICATIONS**

Russotto, R.D., J.D.O. Strong, S.J. Camargo, A. Sobel, G.S. Elsaesser, M. Kelley, A. Del Genio, Y. Moon, and D. Kim (2022). **Evolution of Tropical Cyclone Properties Across the Development Cycle of the GISS-E3 Global Climate Model.** *Journal of Advances in Modeling Earth Systems*, 14, e2021MS002601, [doi: 10.1029/2021MS002601](https://doi.org/10.1029/2021MS002601).

- Biasutti, M., R.D. Russotto, A. Voigt, and C.C. Blackmon-Luca (2021). **The Effect of an Equatorial Continent on the Tropical Rain Belt. Part 1: Annual Mean Changes in the ITCZ.** *Journal of Climate*, 34, 5813-5828, [doi: 10.1175/JCLI-D-20-0739.1](https://doi.org/10.1175/JCLI-D-20-0739.1).
- Russotto, R.D. and M. Biasutti (2020). **Polar Amplification as an Inherent Response of a Circulating Atmosphere: Results from the TRACMIP Aquaplanets.** *Geophysical Research Letters*, 47, e2019GL086771, [doi:10.1029/2019GL086771](https://doi.org/10.1029/2019GL086771).
- Russotto, R.D. and T.P. Ackerman (2018). **Changes in clouds and thermodynamics under solar geoengineering and implications for required solar reduction.** *Atmospheric Chemistry and Physics*, 18, 11905-11925, [doi:10.5194/acp-18-11905-2018](https://doi.org/10.5194/acp-18-11905-2018).
- Russotto, R.D. and T.P. Ackerman (2018). **Energy transport, polar amplification, and ITCZ shifts in the GeoMIP G1 ensemble.** *Atmospheric Chemistry and Physics*, 18, 2287-2305, [doi: 10.5194/acp-18-2287-2018](https://doi.org/10.5194/acp-18-2287-2018).
- Smyth, J.E., R.D. Russotto, and T. Storelvmo (2017). **Thermodynamic and dynamic responses of the hydrological cycle to solar dimming.** *Atmospheric Chemistry and Physics*, 17, 6439-6453, [doi: 10.5194/acp-17-6439-2017](https://doi.org/10.5194/acp-17-6439-2017).
- Lenferna, A., R.D. Russotto, A. Tan, S. Gardiner, and T. Ackerman (2017). **Relevant climate response tests for stratospheric aerosol injection: A combined ethical and scientific analysis.** *Earth's Future*, 5, 577-591, [doi: 10.1002/2016EF000504](https://doi.org/10.1002/2016EF000504).
- Russotto, R.D., T.P. Ackerman, and D.R. Durran (2016). **Sensitivity of thin cirrus clouds in the tropical tropopause layer to ice crystal shape and radiative absorption.** *Journal of Geophysical Research: Atmospheres*, 121, 2955-2972, [doi: 10.1002/2015JD024413](https://doi.org/10.1002/2015JD024413).
- Russotto, R.D., T. Storelvmo, and R.B. Smith (2013). **Modeling aerosol activation in a tropical, orographic, island setting: Sensitivity tests and comparison with observations.** *Atmospheric Research*, 134, 12-23, [doi: 10.1016/j.atmosres.2013.07.017](https://doi.org/10.1016/j.atmosres.2013.07.017).

#### **FELLOWSHIPS AND GRANTS**

- National Defense Science and Engineering Graduate (NDSEG) Fellowship, 2013-2016
- Sigma Xi Grant-in-Aid of Research, 2011
- Yale University Tetelman Fellowship for International Research in the Sciences, 2011
- Yale University Richter Summer Fellowship, 2011

## AWARDS AND HONORS

- University of Washington Top Scholar Award, 2012
- Distinction in the Geology & Geophysics major, 2012
- Pat Wilde Prize for Excellence in Marine Geology and Oceanography, 2012
- Elected to Phi Beta Kappa, 2011
- Deerfield Beach High School valedictorian, 2008
- National Merit Scholar, 2008
- National AP Scholar, 2008

## TEACHING EXPERIENCE

### **University of Washington:**

- Teaching Assistant (TA) for ATM S 111 (Global Warming), Autumn 2013. Taught four weekly discussion sections and held office hours. With one other TA, created section materials, homework assignments and exams. Professor: Abigail Swann.
- Lead TA for Atmospheric Sciences department, 2015-2016. Coordinated TA orientation activities, curated previous teaching materials and collected feedback on TA experience which I passed on to the department.
- Reader/Grader for ATM S 341 (Atmospheric Radiative Transfer), Spring 2017. Assigned and graded homework and held office hours to assist students with homework.

## ORGANIZATIONS AND OUTREACH

- Graduate Co-President of UW American Meteorological Society student chapter, 2015-2017.
- Founding president of Club Geo, the Yale undergraduate geoscience organization. President, 2010-2011; Treasurer, 2011-2012.
- Gave lecture on "Science of Clouds and Precipitation" for local middle and high school students for the inaugural Splash at Yale event, October 2011.

## CONFERENCE AND SEMINAR ORGANIZING

### **LDEO Ocean and Climate Physics Seminar, 2019-2020**

- Co-coordinator of weekly seminar series
- Brought in diverse group of speakers on limited budget
- Managed speaker travel logistics and meeting schedules

### **Graduate Climate Conference, Pack Forest, WA, 28-30 October 2016:**

- Session chair, *Atmosphere: Dynamics, Clouds and Chemistry*
- Pamphlet committee chair
- Abstract evaluator

## COMPUTING SKILLS

Programming languages/environments experienced with:

- Python: 10+ years experience. Libraries I have used regularly:
  - XArray
  - Dask
  - Pandas
  - Geopandas
  - NumPy
  - Matplotlib
  - Pytest
- Matlab
- Fortran
- UNIX
- LaTeX
- HTML

Coursework experience with:

R, Mathematica, C++, Java

Experience with collaborative code development in Github, including contributing to the XArray open source project, and numerous projects at Gro Intelligence. At Gro I was an approver for our ontology Github repository.

Cloud experience: running parallelized, gridded computations on AWS EC2 instances with the XArray/Dask/Zarr stack, data input/output to S3, and developing code locally for Docker containers that can be run as ECS tasks. Also created personal website ([rickrussotto.com](http://rickrussotto.com)) hosted on a publicly viewable S3 bucket.

## WEATHER FORECASTING

- Weather Challenge (WxChallenge.com) forecaster on University of Washington team, 2012-2014. (handle: russo)
- Highest-ranked UW forecaster for Syracuse, NY (KSYR), 2012

## ONLINE PROFILES

Github: <https://github.com/rdrussotto>  
Google Scholar: <https://scholar.google.com/citations?user=Gcio9nkAAAAJ&hl=en>  
ORCID: <https://orcid.org/0000-0002-7981-735X>  
LinkedIn: <https://www.linkedin.com/in/rick-russotto-b8606534/>  
Personal website: <http://rickrussotto.com>

## TALKS

**Responses of the Climate to Solar Geoengineering as Simulated by Reducing the Solar Constant.** SEAS Colloquium in Climate Science, Columbia University, New York, NY, 12 September 2019.

**Rapid Adjustments, Climate Feedbacks, and Polar Amplification in a Multimodel Aquaplanet Ensemble.** Lamont Postdoctoral Symposium, Lamont-Doherty Earth Observatory, Palisades, NY, 11 September 2019.

**Changes in the ITCZ under combined greenhouse gas and solar forcings: Insights from the Geoengineering Model Intercomparison Project.** *2<sup>nd</sup> WCRP Grand Challenge Meeting on Monsoons and Tropical Rain Belts*, Trieste, Italy, 5 July 2018.

**How much sunlight would you need to reflect to compensate for a quadrupling of CO<sub>2</sub>?** Atmospheric Sciences Colloquium (Ph.D. defense), University of Washington, Seattle, WA, 25 May 2018.

**How much sunlight would you need to reflect to compensate for a given increase in CO<sub>2</sub>?** Seminar, Sandia National Laboratories, Albuquerque, NM, 24 Jan. 2018.

**Effects of Solar Geoengineering on Clouds, Energy Transport and the ITCZ.** Seminar, NOAA Geophysical Fluid Dynamics Laboratory, Princeton, NJ, 13 Nov. 2017.

**Effects of Solar Geoengineering on Clouds, Energy Transport and the ITCZ.** Seminar, Brookhaven National Laboratory, Upton, NY, 31 July 2017.

**Science Briefing: Marine Cloud Brightening.** *Geoengineering Research Governance Project Workshop*, Oxford, UK, 22 June 2017.

**Effects of Solar Geoengineering on Meridional Energy Transport and the ITCZ.** Seminar, University of Washington, Seattle, WA, 3 April 2017.

**Effects of Solar Geoengineering on Meridional Energy Transport and the ITCZ.** *American Meteorological Society Annual Meeting*, Seattle, WA, 24 January 2017.

**Session Introduction: Atmosphere: Dynamics, Clouds and Chemistry.** *10<sup>th</sup> Graduate Climate Conference*, Pack Forest, WA, 30 October 2016.

**The Effects of Ice Crystal Shape on the Evolution of Optically Thin Cirrus Clouds in the Tropics.** Seminar (COGS talk), University of Washington, Seattle, WA, 15 January 2015.

**Effects of non-spherical ice crystal shape on modeled properties of thin Tropical Tropopause Layer cirrus.** *NASA ATTREX Science Team Meeting, Boulder, CO, 21 October 2014.*

## **POSTER PRESENTATIONS**

Russotto, R.D., M. Caffrey, M. Powell, C. Lepore, E. Schneider, J.G. Dwyer, A. Qaddoumi, L. Dinh, and M. Simonetti. **Global Calculations of Tropical Cyclone Return Periods and an ACE-like Risk Metric.** *AGU 2022 Fall Meeting, Chicago, IL, December 2022.*

Russotto, R.D. and M. Biasutti. **Polar Amplification as an Inherent Response of a Circulating Atmosphere: Results from the TRACMIP Aquaplanets.** *AMS 2020 Annual Meeting, Boston, MA, January 2020.*

Russotto, R.D., and T.P. Ackerman. **How Much Sunlight Reflection is Necessary to Compensate for a Given Increase in CO<sub>2</sub>?** *AGU 2018 Fall Meeting, Washington, DC, December 2018.*

Russotto, R.D., and T.P. Ackerman. **Changes in Clouds Under a Combined CO<sub>2</sub> Increase and Solar Decrease.** *AGU 2017 Fall Meeting, New Orleans, LA, December 2017.*

Russotto, R.D., T.P. Ackerman, J.E. Smyth, and T. Storelvmo. **Energy Transport, Polar Amplification, ITCZ Shifts, and Clouds in the GeoMIP G1 Ensemble.** *Gordon Research Conference on Climate Engineering, Newry, ME, July 2017.*

Russotto, R.D., T.P. Ackerman, and D.M.W. Frierson. **Effects of Solar Geoengineering on Meridional Energy Transport and the ITCZ.** *AGU 2016 Fall Meeting, San Francisco, CA, December 2016.*

Russotto, R.D., T.P. Ackerman, and D.M.W. Frierson. **Effects of Solar Geoengineering on Meridional Energy Transport and Tropical Precipitation.** *10<sup>th</sup> Graduate Climate Conference, Pack Forest, WA, October 2016.*

Russotto, R.D., T.P. Ackerman, and B. Kravitz. **A Strategy for the Use of Solar Climate Engineering.** *6<sup>th</sup> GeoMIP Workshop, Oslo, Norway, June 2016.*

Russotto, R.D., T.P. Ackerman, B. Kravitz, and S.F. Potter. **Global Climate Model Simulations of a Temporary Solar Climate Engineering Deployment.** *9<sup>th</sup> Graduate Climate Conference, Woods Hole, MA, November 2015.*

Russotto, R.D., T.P. Ackerman, and D.R. Durrant. **Sensitivity of Thin Tropical Cirrus Clouds to Ice Crystal Shape and Radiative Absorption.** *Gordon Research Conference on Radiation and Climate, Lewiston, ME, July 2015.*

Russotto, R.D., T.P. Ackerman, and D.R. Durran. **Sensitivity of Thin Tropical Cirrus Clouds to Ice Crystal Shape and Radiative Absorption.** *Composition and Transport in the Tropical Troposphere and Lower Stratosphere Meeting*, Boulder, CO, July 2015.

Russotto, R.D., T. Storelvmo, and R.B. Smith. **Factors Controlling Droplet Concentration and Size Distribution in Clouds over Dominica.** *AGU 2011 Fall Meeting*, San Francisco, CA, December 2011.

Russotto, R.D., R.A. Holman, J. Stanley, and M.L. Palmsten. **Determination of Nearshore Surface Slope Field and Wave Heights Using Optical Polarimetry.** *AGU 2010 Fall Meeting*, San Francisco, CA, December 2010.

#### **OTHER CONFERENCES ATTENDED**

- Reinsurance Association of America Cat Risk Management conference, Orlando, FL, May 2022 and February 2023
- AMS 2024 annual meeting, Baltimore, MD, January 2024
- New York Meeting on Tropical Cyclones and Global Storm-Resolving Analysis, New York, NY, February 2024

Last updated: March 12, 2024