Adam Massmann

http://www.columbia.edu/~akm2203/

adam "at" ketawaters "dot" com
Based in New York City

Interests

human-land-atmosphere interaction; methods for blending physical models and data; tools for collaboration; how we select, communicate, and analyze assumptions in Earth science.

Education

- **Ph.D. in Environmental Engineering**, Columbia University, *2022*
- **M.S. in Atmospheric Science**, University at Albany, *2016*
- **B.S. in Civil Engineering**, University of Washington, *cum laude, 2014*

Consulting Experience (with Keta Waters)

Quinault Indian Nation: *April 2022 - present*
- *TransAlta Water Right Acquisition: Phase I Feasibility Study*. Stream flow analysis and reservoir simulations.

Swinomish Indian Tribal Community: *Nov. 2022*
- Reservoir simulations related to US Golden Eagle water right application.

Squaxin Island Tribe and Thurston County: *Oct. 2019 - Oct. 2021*
- Develop Soil Water Balance model to estimate recharge for the Thurston County Groundwater Model.

Squaxin Island Tribe: *June 2018 – March 2020*
- Develop Soil Water Balance model to estimate recharge for the Johns/Goldsborough watersheds.

Research experience

Graduate Research Assistant: *Sept. 2016 - June 2022*
- *Environmental Engineering*, Columbia University

Graduate Research Assistant: *May 2015 - Aug. 2016*
- *Atmospheric and Environmental Sciences*, University at Albany

Undergraduate Research Assistant: *Nov. 2012 - Aug. 2014*
- *Civil and Environmental Engineering*, University of Washington

Teaching and mentoring experience

Senior Lead Teaching Fellow: *Aug. 2020 - June 2021*
- Mentored six graduate students from across disciplines (Nursing, Marketing, Classics, Italian, Religion, Theater).
- Co-facilitated, with Abby Schroering, a two-part learning community on "Considering the Whole Self in Teaching and Learning", for both the Columbia University Center for Teaching and Learning, and also the national CIRTL network.

Lead Teaching Fellow: *Aug. 2019 - May 2020*
- Created a workshop on "Git for course deployment and websites".
- Built a collaborative website for graduate assistants to share resources.

Graduate Teaching Assistant: *Sept. 2020 - May 2021*
- *Environmental Engineering, Columbia University*
  - Courses: *A Better Planet By Design, Hydrosystems Engineering*

Graduate Teaching Assistant: *Aug. 2014 - May 2015*
- *Atmospheric and Environmental Sciences, University at Albany*
  - Courses: *Introduction to Environmental Science; Surface Hydrology and Hydrometeorology*

Awards, fellowships and scholarships

- **Presidential Fellow**, Columbia University, 2019-2022
- **Senior Lead Teaching Fellowship**, Columbia University, 2020-2021
- **Lead Teaching Fellowship**, Columbia University, 2019-2020
- **PI, XSEDE Startup Allocation:** "A moist static energy approach to understanding wet and dry season transitions in the Amazon rainforest," 2016-2018
- **NSF Graduate Research Fellowship Program**, 2015-2019
- **AMS Student Travel Grant**, 16th Conference on Mountain Meteorology, 2014
- **Annual Dean's List**, University of Washington, 2012-2014
- **Ruth and Richard Meese Endowed Scholarship**, Department of Civil Engineering, University of Washington, 2013-2014
- **Mary Gates Research Scholarship**, University of Washington, 2013
- **John Arthur Elliot Endowed Scholarship**, Department of Civil Engineering, University of Washington, 2013

Technical skills

Software
- **Tools**: Emacs, Debian, Python, Git, Latex, pandoc
- **Free Software Contributions**: Stan (docs); hvega; hmatrix; FLUXNETcitations; GNU Guix

Field observations and hardware
- *Campbell Scientific dataloggers, InterMet radiosondes, PARSIVEL disdrometers, METEK Micro Rain Radars, HOBO dataloggers, iButton chips, Raspberry Pi boards, eddy-covariance turbulent flux estimation.*

Construction
- *Shaft, steel and concrete construction; tractor operation; manlift operation.*

Field experience

- CCOPE-2015 Field Campaign (2015), Chile: *field operations lead*
- Pre-OLYMPEX Field Campaign (2014), Washington State: *site design, testing and deployment (snow depth)*
- Snoqualmie Pass Snow Energy Balance Research Site (2013-2014), Washington State: *primary field technician; software design for data archival and quality control*

Additional education

- *Innovative Teaching Summer Institute*, Columbia University Center for Teaching and Learning, June 2019
- *Implicit Bias Workshop*, Columbia University, March 2019
- *Fluid Dynamics of Sustainability and the Environment*, Department of Applied Mathematics and Theoretical Physics, University of Cambridge, September 2016

Miscellaneous activities

- Co-organized the 2021 Columbia University Environmental Engineering Summer Seminar Series
- "Getting a Ph.D. in Environmental Engineering" information session (led by Ian Billinge), Nov. 2020
- Collegiate athletics and academic career Q&A, *Northwest Water Polo Club*, May 2020
- STEM Starters Outreach, Education Lab, Columbia University, Sept. 2019
- Volunteer, *New York Scientific Data Summit*; June, 2019
- Essay reader: *Washington State Opportunity Scholarship*; Mar. 2019
- 6th Grade Science Interviewee; Realm School (Berkeley, CA); Sept. 2016
- UAlbany Weather Camp Volunteer; University at Albany; Aug. 2016
- Science Outreach to Voorheesville HS students; University at Albany; Mar. 2016
- Science Outreach at Liceo Mariano Latorre; Curanilahue, Chile; Aug. 2015
- Engineering Discovery Day; University of Washington; 2013, 2014
- Volunteer Board Member, Northwest Youth Water Polo, Oct. 2013 - Aug. 2014
- Past reviewer for *JGR - Biogeosciences*, *Geophysical Research Letters*, *Journal of Applied Meteorology and Climatology*, *Journal of Climate*, *Journal of Hydrometeorology*, *Water Resources Research*, *Weather and Forecasting*

Publications

– **Massmann, A.,** 2022. Estimating ecosystem evaporation response to aridity with theory and causality. Doctoral dissertation, *Columbia University*. doi:10.7916/m1gy-x889.
  – Chapter 4, "Estimating the ecosystem evaporation response to interventions on soil moisture: confounding and causal modeling in a simulated world", **is new material** that has not been published elsewhere; **Olya Skulovich** and **Pierre Gentine** collaborated on this project.
– **Massmann, A.**, Gentine, P. and Runge, J., 2021. Causal inference for process understanding in Earth sciences. arXiv:2105.00912.
– Rojas, Y., Minder, J.R., Campbell, L.S., **Massmann, A.** and Garreaud, R., 2021. Assessment of GPM IMERG satellite precipitation estimation and its dependence on microphysical rain regimes over the mountains of south-central Chile. *Atmospheric Research*, 253, p.105454. doi.org:10.1016/j.atmosres.2021.105454.
– **Massmann, A.**, Gentine, P. and Lin, C., 2019. When does vapor pressure deficit drive or reduce evapotranspiration? *Journal of Advances in Modeling Earth Systems*, 11. doi:10.1029/2019MS001790 arXiv:1805.05444. * **Top Downloaded Paper (10%), 2018-2019**
– Gentine, P., **Massmann, A.**, Lintner B.R., Alemohammad, S.H., Fu, R., Green, J.K., Kennedy, D. and Vilà-Guerau de Arellano J., 2019. Land Atmosphere Interaction in the Tropics. *Hydrology and Earth System Sciences*. doi:10.5194/hess-2019-12.
– Fults, L.S., **Massmann, A.K.**, Montecinos, A., Andrews, E., Kingsmill, D.E., Minder, J.R., Garreaud, R.D. and Snider, J.R., 2019. Wintertime Aerosol Measurements during the Chilean Coastal Orographic Precipitation Experiment. *Atmospheric Chemistry and Physics*. doi:10.5194/acp-2019-185.
– **Massmann, A.K.**, Minder, J.R., Garreaud, R.D., Kingsmill, D.E., Valenzuela, R.A., Montecinos, A., Fults, S.L. and Snider, J.R., 2017. The Chilean Coastal Orographic Precipitation Experiment: Observing the influence of microphysical rain regimes on coastal orographic precipitation. *Journal of Hydrometeorology*, 18(10), pp.2723-2743. doi:10.1175/JHM-D-17-0005.1.
– Wayand, N.E., **Massmann, A.**, Butler, C., Keenan, E., Stimberis, J. and Lundquist, J.D., 2015. A meteorological and snow observational data set from Snoqualmie Pass (921 m), Washington Cascades, USA. *Water Resources Research*, 51(12), pp.10092-10103. doi:10.1002/2015WR017773.
– Lapo, K.E., Hinkelman, L.M., Landry, C.C., **Massmann, A.K.** and Lundquist, J.D., 2015. A simple algorithm for identifying periods of snow accumulation on a radiometer. *Water Resources Research*, 51(9), pp.7820-7828. doi:10.1002/2015WR017590.
– Lundquist, J.D., Wayand, N.E., **Massmann, A.**, Clark, M.P., Lott, F. and Cristea, N.C., 2015. Diagnosis of insidious data disasters. *Water Resources Research*, 51(5), pp.3815-3827. doi:10.1002/2014WR016585.

Presentations (first author)

– Massmann, A., 2020. What do we know? Or, how we need a framework for consolidating and collaborating on climate knowledge. *Columbia University Earth and Environmental Engineering Summer Seminar Series*, New York, NY.
– Massmann, A., 2019. Causality and predictions; engineering and science: the applicability of causal methods to earth science and the potential for progress at the human-environment interface. Oral presentation, *Columbia University Earth and Environmental Engineering Graduate Symposium*, New York, NY.
– Massmann, A., 2019. Probabilistic graphical models, causality and software. Oral presentation, *Workshop on Data Analytics for Climate and Earth (DANCE)*, Arrowhead Lake, CA.
– Massmann, A., Gentine, P. and Wild, M., 2018. Propagator networks and truth maintenance systems: blending physical constraints and data to understand land-atmosphere interaction in the pre-satellite and pre-FLUXNET era. Title modified post-submission to: "Causal Bayesian networks in earth science research: an example examination of North American dimming in the 1950s-1970s". Poster presentation, *AGU 2018 Fall Meeting*, Washington D.C.
– Massmann, A., Gentine, P. and Lin, C., 2017. When does vapor pressure deficit drive or reduce evapotranspiration? Oral presentation, *AGU 2017 Fall Meeting*, New Orleans, LA.
– Massmann, A., Gentine, P. and Lin C., 2017. When does vapor pressure deficit drive or reduce evapotranspiration? Oral presentation, *Columbia University Earth and Environmental Engineering Graduate Symposium*, New York, NY.
– Massmann, A.K., Minder, J.R., Kingsmill, D.E., Garreaud, R., Montecinos, A., Snider, J.R., Fults, S., Valenzuela, R. and Falvey, M. 2016. The Chilean Coastal Orographic Precipitation Experiment Pilot Project. Overview and Preliminary Results. Oral presentation, *17th Conference on Mountain Meteorology*, Burlington, VT.
– Massmann, A., Minder, J., Montecinos, A. and Fults, S., 2015 (invited). CCOPE-15 Trabajo Preliminar: Usando Perfiles de Radares para Clasificar Lluvia en la Cordillera Nahuelbuta [CCOPE-15 Preliminary Work: Using Radar Profiles to Classify Rain in the Nahuelbuta Mountains]. *Seminario de Geofísica*, Universidad de Concepción, Concepción, Chile.

Presentations (continued)

- Massmann, A.K. and Minder, J.R., 2015. Utilizing a Semi-idealized Modeling Framework to Understand Meso- and Convective-scale dynamics of severe Lake-effect Snowstorms. Poster presentation, *16th Conference on Mesoscale Meteorology*, Boston, MA.
- Massmann, A.K. and Minder, J.R., 2015. Utilizing a Semi-idealized Modeling Framework to Understand Observed Lake-effect Snowstorm Dynamics. Poster presentation, *40th Annual Northeastern Storm Conference*, Saratoga Springs, NY.
- Massmann, A.K., Lundquist, J.D., and Raleigh, M.S., 2013. Using Inexpensive Temperature Sensors to Estimate Incoming Radiation and Snow Surface Albedo. Poster presentation, *University of Washington Undergraduate Research Symposium*, Seattle, WA.