Jack Dechow Ph.D.

University of North Carolina
Global Hydrology Lab
Dept. of Earth, Marine, and Env. Sciences

dechowjack.github.io
jldechow@gmail.com
jldechow@unc.edu

EDUCATION

2024 PhD Earth Sciences | The Ohio State University
Advisor Dr. Michael Durand
"*Merging remote sensing observations and land surface models to improve estimates of the spatial and temporal dynamics of snow water equivalent and surface density"*

2019 BSc Physics | Knox College
Cum laude

RESEARCH STATEMENT

I am a snow hydrologist with an extensive background in snowpack mass-and-energy balance modeling, as well as snowpack processes algorithm development. My primary interest is developing methods to improve our ability to model the accumulation, distribution, and melt timing of snow in mountainous regions through data fusion and machine learning techniques. The goal of my research is to leverage the large record of remote sensing products and apply geospatial analysis techniques to improve our ability to model mountain snowpacks and using these improved models to further investigate the role of seasonal snow in the annual water balance.

RESEARCH INTERESTS

Data Science | Machine Learning | Remote Sensing | Snow Modeling | Geospatial Information Systems | Algorithm Development | Model and Remote Sensing Assimilation | Climate Modeling | Least Squares Adjustments | Statistical Downscaling Techniques | Non-linear Optimization | Geospatial Analysis

PUBLICATIONS IN PRESS

2024 Durand, M., Johnson, JT., **Dechow, JL.,** Tsang, L., Borah, F., Kim, EJ. *"Retrieval of SWE from dual-frequency radar measurements: Using time series to overcome the need for accurate a priori information"* **The Cryosphere** *(http://doi.org/10.5194/tc-18-139-2024)*

2024 Prugh, LR., Lundquist, JL., Sullender, B., Cunningham, CX., **Dechow, JL.,** Borg, BL., Sousanes, PJ., Stehn, S., Durand, MT. *"Landscape heterogeneity buffers the impact of extreme winter weather on wildlife"* **Communications Biology** *(http://doi.org/10.1038/s42003-024-07195-1)*

PUBLICATIONS IN REVIEW

2026 **Dechow, JL.,** Durand, M., Wrzesien, M., Lundquist, JL., Rittger, K., Dozier, J., Pavelsky, TM. *"Merging regional climate models and remote sensing observations to better estimate mountain snow water equivalent"* **Water Resources Research** *(http://doi.org/10.22541/essoar.175915579.90649700/v1)*

2026 Chudley, TR., Stokes, CR., Lea, JM., Winterbottom, T., Law, R., Clason, CC., **Dechow, JL.** *"Seasonal ice dynamics control the timing of crevasse drainage at a fast-flowing outlet glacier"* **AGU Advances** *(https://doi.org/10.31223/X5H45B)*

PUBLICATIONS IN PREPARATION

2026 **Dechow, JL**., Durand, MT., Wrzesien, ML., Pavelsky, TM., Kumar, SJ., Yadav, B. *"Validation of the CoReSSD 1 km North American SWE and Snowfall Product over WY2001-WY2021"* to be submitted to **Earth System Science Data**

DATASETS AND SOFTWARE RESOURCES - MY GITHUB

2026 **Dechow, JL** Cluster Computing Workshop. *GitHub*. dechowjack.github.io/ClusterComputingWorkshop/

2026 **Dechow, JL** CoReSSD Documentation. *GitHub*. dechowjack.github.io/coressd-docs/

CONFERENCE ABSTRACTS AND PRESENTATIONS

2025 **Dechow, JL.,** Durand, M., Yadav, B., Pavelsky, TM., Wrzesien, ML., Kumar, SJ. *"Initial validation of the CoReSSD 1 km North American snow water equivalent data product"* **American Geophysical Union** Fall Meeting, New Orleans LA **Poster**

2024 **Dechow, JL**., Durand, MT., Lundquist, JD., Prugh, LR., Sullender, B., Cunningham, CX. *"Merging land surface models and snow pit data for improved snow surface density measurements for wildlife tracking purposes"* **Eastern Snow Conference** Annual Meeting, Waterloo ON **Talk**

Dechow, JL., Durand, M., Gómez, D., Yadav, B., Pavelsky, TM., Wrzesien, ML., Lundquist, JD., Rittger, K. *"Surrogate modeling and constrained optimization to improve estimates of snow water equivalent: A comparison of linear and non-linear methods to merge regional climate models and remote sensing observations"* **American Geophysical Union** Fall Meeting, Washington DC **Poster**

2023 Prugh, LR., Lundquist, JL., Sullender, B., Cunningham, CX., **Dechow, JL.,** Borg, BL., Sosuanes, PJ., Stehn, S., Durand, MT., "*Landscape Heterogeneity Partially Buffers the Impact of Extreme Winter Weather on Wildlife*" **American Geophysical Union** Fall Meeting, San Francisco CA **Talk**

Dechow, JL., Durand, M., Lundquist, JL., Prugh, L., Sullender, B., Cunningham, C., Lumbrazo, C., "*Estimating Snow Surface Density with Linear and Non-Linear Methods for Wildlife Tracking Applications*" **American Geophysical Union** Fall Meeting, San Francisco CA **Poster**

Dechow, JL., Durand, M., Prugh, L., Lundquist, JL., Sullender, B., Cunningham, C., Lumbrazo, C., Breen, K., "*Post Processing Techniques for better Surface Density Estimates for use in Wildlife Tracking Applications*" **Eastern Snow Conference** Annual Meeting, Easton PA **Poster**

2022 **Dechow, JL.,** Durand, M., Gómez, D., Wrzesien, M., Lundquist, JL., Rittger, K., Dozier, J., Pavelsky, TM., "A Comparison of Constrained Least Squares Adjustment and Non-Linear Solvers to Estimate Snow Water Equivalent from Regional Climate Models and Remote Sensing Observations" **American Geophysical Union** Fall Meeting, Chicago IL **Poster**

Dechow, JL., Durand, M., Lundquist, JL., Prugh, L., Sullender, B., Lumbrazo, C., Breen, K., Cunningham, C., "*Predicting Surface Density using Snow Models and Assimilation for Wildlife Applications*" **Eastern Snow Conference** Annual Meeting, Canada (Online) **Talk**

ACADEMIC APPOINTMENTS

FA 2024 – Present Post-Doctoral Researcher
Department of Earth, Marine, and Environmental Sciences (EMES)
University of North Carolina, Chapel Hill
Validation and Development for the NASA CoReSSD Project

WI 2024 – SU 2024 Graduate Teaching Assistant
The Ohio State University | School of Earth Sciences

FA 2019 – FA 2023 Graduate Research Assistant
The Ohio State University | School of Earth Sciences

SU 2018 Research Intern
NASA Student Airborne Research Program
"Mapping the Montecito Mudslide Plume via Remote Sensing"

HONORS AND AWARDS

2024 Friends of Orton Hall Graduate Student Grant ($1500)
Ohio State University | School of Earth Sciences

2020 Friends of Orton Hall Graduate Student Grant ($1000)
Ohio State University | School of Earth Sciences

2020 CUAHSI Snow School
Most memorable presentation

2019 Lawrence L. DeMott Prize in Earth Science ($500)
Knox College | Environmental Science Department

TEACHING AND MENTORING EXPERIENCE

FA 2024 – Present Programming Mentor to Grad. + Undergrad. Researchers | Pavelsky Lab UNC
WI 2024 – SP 2024 Graduate TA | ES1200 Introduction to Earth Science Laboratory | OSU
FA 2021 – SP 2024 Graduate Student Mentor to Undergraduate Researchers | Durand Lab OSU
FA 2017 – SP 2019 Physics Tutor | Knox College Center for Teaching and Learning
FA 2016 – SP 2017 Teaching Assistant | Knox College Physics Department

ACADEMIC SERVICE

FA 2025 – Present First-Time Presenter Reviewer – AGU Annual Meeting

SU 2024 – Present Reviewer – EGUSphere

FIELD EXPERIENCE

January 2020 CUAHSI Snow Measurement Field School

PROGRAMMING SKILLS

MATLAB | Python | Julia | QGIS | GDAL | NASA LISF | NoahMP | Bash Scripting | FORTAN | Slurm | High Performance Computing | Large Scale Data Analysis | Geospatial Techniques | Microsoft Office

RELEVANT GRADUATE COURSEWORK

Geospatial Numerical Analysis | Glacial Geomorphology | Land Surface Hydrology | Differential Equations | Linear Algebra | Adjustment Computations | Machine Learning Applications in Earth Science | CUAHSI Snow Measurement Field School 2020

REFERENCES

Dr. Michael Durand | PhD Advisor
Professor
School of Earth Sciences
The Ohio State University
durand.8@osu.edu
614-247-4835

Dr. Tamlin Pavelsky | Post Doctoral Advisor
Professor
Department of Earth, Marine, and Environmental Sciences
University of North Carolina
pavelsky@unc.edu
919-962-4239

Dr. Demian Gómez | PhD Committee Member
Associate Professor
School of Earth Sciences
The Ohio State University
gomez.124@osu.edu
901-900-7324