

# Megan Thompson-Munson

Ice Sheet & Climate Scientist

Pronouns: she/her/hers

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## Education

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### University of Colorado

Boulder, CO

PhD in Atmospheric and Oceanic Sciences (ATOC)

August 2024

Certificate in Hydrologic Sciences

- Dissertation: *Atmosphere–Firn Interactions Across the Greenland Ice Sheet in a Changing Climate*
- Advisors: Dr. Jennifer Kay and Dr. Bradley Markle

### University of Wyoming

Laramie, WY

MS in Geology

May 2020

- Thesis: *Observations and Implications of Three-Dimensional Deformation in the Greenland Ice Sheet*
- Advisor: Dr. Neil Humphrey

### University of Massachusetts

Amherst, MA

BS in Geology; BS in Environmental Science (dual degrees)

May 2017

- Thesis: *Understanding the Environments in which Early Humans Lived: Insights from Organic Geochemical Analyses of East African Rift Valley Paleolakes*
- Advisor: Dr. Isla Castañeda

## Publications and Presentations

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### *In-Progress Manuscripts*

- [2] **Thompson-Munson, M.**, Kay, J.E., Markle, B.R., Bertrand, L., and Gallagher, M.R. An Observational Constraint for Future Greenland Rainfall in a Warmer Atmosphere. In prep for *Geophysical Research Letters*.
- [1] Ogunmolasuyi, A., Meyer, C., McDowell, I., **Thompson-Munson, M.**, and Baker, I. FirnLearn: A Neural Network based approach to Firn Densification Modeling. In prep for *Journal of Glaciology*.

### *Peer-Reviewed Publications*

- [5] **Thompson-Munson, M.**, Kay, J.E., and Markle, B.R. (2024). Greenland's firn responds more to warming than to cooling. *The Cryosphere*. <https://doi.org/10.5194/tc-18-3333-2024>
- [4] The Firn Symposium Team (35 authors including **Thompson-Munson, M.**). (2024). Firn on Ice Sheets. *Nature Reviews Earth and Environment*. <https://doi.org/10.1038/s43017-023-00507-9>
- [3] **Thompson-Munson, M.**, Wever, N., Stevens, C.M., Lenaerts, J.T.M., and Medley, B. (2023). An evaluation of a physics-based firn model and a semi-empirical firn model across the Greenland Ice Sheet (1980–2020). *The Cryosphere*. <https://doi.org/10.5194/tc-17-2185-2023>
- [2] MacLennan, M.L., Lenaerts, J.T.M., Shields, C.A., Hoffman, A.O., Wever, N., **Thompson-Munson, M.**, Winters, A.C., Pettit, E.C., Scambos, T.A., Wille, J.D. (2023). Climatology and Surface Impacts of Atmospheric Rivers on West Antarctica. *The Cryosphere*. <https://doi.org/10.5194/tc-17-865-2023>
- [1] Lam, A., Bauer, J.E., Fraass, S., Sheffield, S., Limbeck, M.R., Borden, R.M., **Thompson-Munson, M.**, Fraass, A.J., Hills, J.M., Muskelly, C.E., Hartshorn, K.R., and Bryant, R. (2019). Time Scavengers: An Educational Website to Communicate Climate Change and Evolutionary Theory to the Public through Blogs, Web Pages, and Social Media Platforms. *The Journal of STEM Outreach*. <https://doi.org/10.15695/jstem/v2i1.05>

## Theses

- [3] **Thompson-Munson, M.** (2024). Atmosphere–Firn Interactions Across the Greenland Ice Sheet in a Changing Climate. Doctoral dissertation, University of Colorado.
- [2] **Thompson-Munson, M.** (2020). Observations and implications of three-dimensional deformation in the Greenland Ice Sheet. Master's thesis, University of Wyoming.
- [1] **Thompson-Munson, M.** (2017). Understanding the Environments in which Early Humans Lived: Insights from Organic Geochemical Analyses of East African Rift Valley Paleolakes. Bachelor's thesis, University of Massachusetts.

## Datasets and Tools

- [3] **Thompson-Munson, M.**, Wever, N., Stevens, C.M., Lenaerts, J.T.M., and Medley, B. (2023). Greenland Ice Sheet modeled firn properties from SNOWPACK and the Community Firn Model (1980–2020). Zenodo. <https://doi.org/10.5281/zenodo.7671892>.
- [2] **Thompson-Munson, M.** SUMMEDup 2022: The SUMup Dataset Explorer. <https://github.com/MeganTM/SUMMEDup2022>.
- [1] **Thompson-Munson, M.**, Montgomery, L., Lenaerts, J.T.M., and Koenig, L. (2022). Surface Mass Balance and Snow Depth on Sea Ice Working Group (SUMup) snow density, accumulation on land ice, and snow depth on sea ice datasets 1952-2019. Arctic Data Center. doi:10.18739/A24Q7QR58.

## Conference Abstracts and Presentations

\* indicates invited talk

- [17] **Thompson-Munson, M.**, Kay, J.E., Markle, B.R. (2023). The Nonlinear Effect of Temperature Governs the Asymmetric Response of Greenland Firn to Idealized Atmospheric Warming and Cooling. AGU Fall Meeting, San Francisco, CA.
- [16] Medley, B., Sutterly, T.C., Dattler, M.E., Ryan, J., Siegfried, M., Stevens, C.M., **Thompson-Munson, M.** (2023). Dual-satellite constraint on ice-sheet surface mass balance and firn air content. AGU Fall Meeting, San Francisco, CA.
- [15] \***Thompson-Munson, M.** (29 September 2023). The asymmetric response of Greenland firn to atmospheric warming and cooling. ice+climate seminar, Dartmouth College, Hanover, NH.
- [14] **Thompson-Munson, M.**, Kay, J., and Markle, B. (2023). Characterizing the influence of idealized atmospheric forcings on firn using the SNOWPACK firn model. EGU General Assembly, Vienna, Austria.
- [13] Dunmire, D.R., Wever, N., Banwell, A.F., Lenaerts, J.T.M., **Thompson-Munson, M.** (2022). Future (2015-2100) Ice-Shelf Firn Air Depletion from a Statistical Firn Emulator. AGU Fall Meeting, Chicago, IL.
- [12] \***Thompson-Munson, M.** (5 October 2022). Greenland Data Management: The Firn Community's Perspective. Greenland Data Workshop, Boulder, CO.
- [11] **Thompson-Munson, M.**, Wever, N., Lenaerts, J.T.M., Stevens, C.M., Medley, B., and Keenan, E. (2021). Simulated and Observed Firn Properties Across the Greenland Ice Sheet. AGU Fall Meeting, online.
- [10] **Thompson-Munson, M.**, Humphrey, N.F., Harper, J.T., and Meierbachtol, T.W. (2020). In-Situ Measurements of Three-Dimensional Deformation in the Greenland Ice Sheet. AGU Fall Meeting, online.
- [9] Dunmire, D.R., **Thompson-Munson, M.**, Lenaerts, J., Wever, N., Keenan, E., Banwell, A.F., and Datta, R. (2020). Improving Understanding of Future Antarctic Ice-Shelf Vulnerability to Atmospheric Warming. AGU Fall Meeting, online.
- [8] **Thompson-Munson, M.**, Humphrey, N.F., Harper, J.T., and Meierbachtol, T.W. (2019). Multi-day summer speed-up events in western Greenland's ablation zone driven by non-local ice sheet motion. AGU Fall Meeting, San Francisco, CA.
- [7] **Thompson-Munson, M.** (2019). Evidence of cross-flow deformation in the Greenland Ice Sheet's ablation zone. Northwest Glaciologists Conference, Corvallis, OR.

- [6] Castañeda, I.S., **Thompson-Munson, M.**, Gilchrist, S., Lupien, R., Russell, J.M., Salacup, J., Feibel, C.S., and Cohen, A.S. (2018). Early Pleistocene temperature history of Paleolake Lorenyang, West Turkana Basin (Kenya). AGU Fall Meeting, Washington, D.C.
- [5] Lam, A.R., Bauer, J., Sheffield, S.L., Muskelly, C.E., **Thompson-Munson, M.**, Limbeck, M., Hils, J.M., Hartshorn, K.R., Fraass, A., Fraass, S., Borden, R. (2018). Time Scavengers: A Website to Disseminate Climate Change and Evolutionary Principles to Increase Public Literacy. AGU Fall Meeting, Washington, D.C.
- [4] **Thompson-Munson, M.** and Castañeda, I.S. (2017). Understanding the Environments in which early humans lived: Insights from organic geochemical analyses of East African Rift Valley paleolakes. Massachusetts Undergraduate Research Conference, Amherst, MA.
- [3] **Thompson-Munson, M.**, Castañeda, I.S., Lupien, R., and Russell, J.M. (2017). Evaluation the potential for isoprenoid and branched GDGT temperature reconstructions in West Turkana and Northern Awash Basin sediments. Hominin Sites and Paleolakes Drilling Project Annual Meeting, Tempe, AZ.
- [2] **Thompson-Munson, M.** and Castañeda, I.S. (2015). Late Pliocene and Early Pleistocene temperature reconstructions from paleolakes of the West Turkana and North Awash basins, East Africa. GSA Annual Meeting, Baltimore, MD.
- [1] Castañeda, I.S., **Thompson-Munson, M.**, Lupien, R., Russell, J.M. (2015). Late Pliocene and Early Pleistocene temperature reconstructions from paleolakes of the West Turkana and North Awash Basins, East Africa. AGU Fall Meeting, San Francisco, CA.

### *Reviews Performed*

The Cryosphere (2), Earth System Science Data (1), Journal of Climate (1), Journal of Glaciology (1)

## Teaching and Mentorship Experience

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### *Teaching Positions*

#### **ATOC REU Python Bootcamp**

Lesson Developer and Instructor

University of Colorado  
Boulder, CO

- Jun 2023: Taught “Intro to Python” and “Arrays and Plotting” (12 students, in-person)
- Jun 2022: Taught “Time Series with Pandas” and “Spatial Plots with Cartopy” (9 students, hybrid)
- Jun 2021: Developed and taught “Time Series with Pandas” (17 students, online)

#### **ATOC 1060: Our Changing Environment**

Teaching Assistant

University of Colorado  
Boulder, CO

- Spring 2023 (Jan–May): Supported lecture and led two recitation sections (57 students, in-person)

#### **Lead Graduate Teacher Program**

ATOC Lead TA

University of Colorado  
Boulder, CO

- Spring 2023: Supported ATOC TAs and developed university-wide workshop
- Fall 2022: Supported ATOC TAs and developed department teaching workshop

#### **ATOC 1070: Weather and Atmosphere Lab**

Teaching Assistant / Instructor on Record

University of Colorado  
Boulder, CO

- Fall 2020 (Aug–Dec): Led two lab sections (64 students, online)

#### **GEOG 1010: Physical Geography**

Teaching Assistant

University of Wyoming  
Laramie, WY

- Spring 2020 (Jan–May): Supported lecture and led two lab sections (45 students, in-person and online)
- Fall 2019 (Aug–Dec): Supported lecture and led two lab sections (60 students, in-person)

#### **GEOG 3600 Earth and Mineral Resources**

Teaching Assistant

University of Wyoming  
Laramie, WY

- Fall 2018 (Aug–Dec): Led two lab sections (31 students, in-person)

## Research Mentorship

**Ethan Glenn**, CIRES Research Experience for Community College Students (RECCS)  
**Beth Mason**, BA student in ATOC at University of Colorado

May–July 2023  
Jul 2021–Apr 2022

## Teaching Workshops Developed

**Teaching in ATOC**, University of Colorado 14 Feb 2023  
**Holistic Collaboration: How to Make Networking Less Awkward**, University of Colorado 6 Feb 2023

## Teaching Workshops Attended

**Wellbeing for Ourselves and Our Students**, University of Colorado 08 Feb 2024  
**Grading for Learning**, University of Colorado 25 Aug 2023  
**Supporting Survivors**, University of Colorado 25 Aug 2023  
**Antiracist Pedagogy as Praxis**, University of Colorado 24 Aug 2023  
**Bringing the Self into the Classroom through Storytelling**, University of Colorado 24 Aug 2023  
**The Universal Classroom: Designing Your Course for Diverse Learners**, University of Colorado 23 Aug 2023  
**Disability and Accessibility: What You Need to Know as an Instructor**, University of Colorado 23 Aug 2023  
**Equitable Grading**, University of Colorado 14 Apr 2023  
**Inclusive Practices for Graduate Instructors**, University of Colorado 20 Feb 2023  
**Best Pedagogical Practices for Promoting Mental Health**, University of Colorado 17 Aug 2022  
**Intercultural Communication in the Classroom**, University of Colorado 17 Aug 2022  
**Student Engagement in the Classroom**, University of Colorado 9 May 2022  
**The Universal Classroom: Designing Your Course for Diverse Learners**, University of Colorado 9 May 2022  
**The Hidden Curriculum**, University of Colorado 9 May 2022  
**Teaching About Our Changing Climate**, GETSI 26 Jan 2021  
**Teaching in the Era of COVID-19**, University of Colorado 9 Sep 2020  
**Universal Design for Learning**, University of Colorado 20 Aug 2020  
**Using Dialogue in the Classroom**, University of Colorado 20 Aug 2020  
**How to Be an Anti-Racist in the Classroom**, University of Colorado 19 Aug 2020

## Service, Outreach, and Other Employment

### Interviews and Articles

- [4] Interviewed for the story: *Three days in the field help grad students bridge observations and data* by Stephanie Maltarich. 09 June 2023. CIRES.  
<https://cires.colorado.edu/news/three-days-field-help-grad-students-bridge-observations-and-data>
- [3] **Thompson-Munson, M.** 29 March 2021. *Icebergs*. AntarcticGlaciers.org.  
<http://www.antarcticglaciers.org/glacier-processes/glacier-types/icebergs/>
- [2] Interviewed for the article: *How Does an Iceberg Really Float?* by Isabel Amos-Landgraf. 12 March 2021. GlacierHub. <https://blogs.ei.columbia.edu/2021/03/12/iceberg-really-float/>
- [1] Interviewed about icebergs for *Breakfast with Sammy J* on ABC Radio Melbourne. 2 March 2021.

### Service

**ATOC Forum Committee**, Member Aug 2020–May 2021, Aug 2023–present  
**International Firn Workshop**, Developer, Organizer, Junior Coordinator Jan–Jun 2022  
**University of Colorado Graduate Mentorship Program**, Mentor Aug 2021–May 2022  
**ATOC First-Year Graduate Student Mentorship Program**, Mentor Aug 2021–May 2022  
**Colorado State Science Fair**, Judge 9 Apr 2021  
**ATOC Outreach Committee**, Member, Lead Aug 2020–May 2021

<b>ATOC Justice, Equity, Diversity, and Inclusion Committee</b> , Member	Aug 2020–May 2021
<b>AGU Flash Freeze Competition</b> , Judge	Dec 2020
<b>ATOC Graduate Application Mentorship Program</b> , Mentor, Developer	Aug–Dec 2020
<b>Research Lunch Seminar Series</b> , Lead and Co-Organizer	Jan 2018–Dec 2019
<b>Wyoming State Science Fair</b> , Judge	Mar 2018, Mar 2019
<b>Virtual Climate Scientist Project</b> , Ice Sheet Consultant	Dec 2018

### *Outreach*

<b>Eagle Crest Elementary School</b> , Visiting Scientist	22, 27 Apr 2021
<b>Colorado STEM Academy</b> , Visiting Scientist	9 Apr 2021
<b>Laramie Middle School</b> , Visiting Scientist	5 Mar 2020
<b>Time Scavengers Science Outreach Blog</b> , Collaborator, Writer	2017–2019
<b>University of Minnesota Paleoclimate Class</b> , Virtual Presenter	Apr 2019
<b>Girls Inc. Eureka! STEM Career Development</b> , Activity Developer	Jun 2015

### *Other Relevant Employment*

<b>Mount Rainier National Park</b> , Geoscientists-in-the-Park Interpretative Ranger	May–Sep 2016
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## Field and Laboratory Experience

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<b>CIRES Snow Science Project</b> Lab Technician and Mentor	Boulder, CO Oct–Nov 2022
– Mentored three undergraduate students in building a wind-shielded observation tower for measuring snow accumulation as part of a CIRES-funded project with Dr. Mark Seefeldt	
<b>Niwot Ridge Snow Science Field Work</b> Field Assistant (2 days)	Nederland, CO Summer 2021
– Set up a field station containing instruments for measuring snow height and snow water equivalent	
<b>Lake Agnes Rock Glacier Field Work</b> Field Assistant (1 day)	State Forest State Park, CO Oct 2019
– Hiked equipment up to a rock glacier to collect seismic refraction data in the active region of the glacier	
<b>Southern Sierra Nevada Critical Zone Observatory Field Work</b> Field Assistant (14 days, 11 days)	Sierra Nevada, CA Jul 2018, Jul 2019
– Collected seismic refraction data and assisted with soil and saprolite core recovery from a Geoprobe	
– Surveyed vegetation while mentoring high school students in the Hands on the Land program	
<b>Greenland Ice Sheet Field Work</b> Field Team Member (32 days, 31 days)	Kangerlussuaq and Ilulissat, Greenland May–Jun 2018, May–Jun 2019
– Established first two years of a new firn project in the Greenland Ice Sheet percolation zone	
– Hot-water drilled 100-m boreholes, extracted 30-m firn cores, and traveled by ski and snowmobile	
<b>University of Massachusetts Biogeochemistry Laboratory</b> Research Technician	Amherst, MA May 2015–May 2017
– Used geochemical analyses to quantify biomarker abundances in East African Rift Valley paleolake sediments	
<b>University of Massachusetts Soil Science Laboratory</b> Research Technician	Amherst, MA Sep–Dec 2013
– Evaluated the role of biochar in sustainable agriculture by monitoring crop yield in fields and greenhouses	



## Technical Skills

- **Programming Languages:** Python (excellent), Matlab (proficient), JavaScript (proficient)
- **Systems:** MacOS, Windows, Unix/Linux, high-performance computing
- **Software:** Microsoft Office, Adobe, Inkscape,  $\text{\LaTeX}$ , QGIS, ArcGIS, ENVI, JMP, Git/GitHub, Jupyter Lab/Notebook, Google Colab, Google Earth Engine
- **Field Skills:** Firn coring, hot-water drilling, ground-penetrating radar, seismic refraction, rock drilling, Trimble GPS surveying, snow sampling, automatic weather station deployment

## Awards, Fellowships, and Scholarships

<b>University Fellowship Award</b> , University of Colorado, ATOC, \$1200, \$1700	2023, 2024
<b>Outstanding Student Presentation Award (OSPA)</b> , AGU, \$100	2023
<b>Best Graduate Student ESSS Poster</b> , University of Colorado, \$100	2023
<b>Best Should Teach Silver Award</b> , University of Colorado, Center for Teaching & Learning	2023
<b>CECA Travel Award</b> , CIRES, \$750	2023
<b>Graduate Student Research Award</b> , CIRES, academic-year stipend	2023
<b>Flash Freeze Cryosphere Innovation Award for Students</b> , AGU, \$1000	2021
<b>Best Graduate Student ESSS Poster</b> , University of Colorado, \$50	2021
<b>AntClimNow Dataset Development and Stewardship Grant</b> , SCAR, \$2500	2021
<b>EarthCube Learning Communities Fellow</b> , EarthCube, \$1000	2021
<b>Fall 2020 Lab Teaching Assistant Award</b> , University of Colorado, ATOC, \$250	2021
<b>2020 Outstanding Master's Student</b> , University of Wyoming Geology & Geophysics, \$100	2021
<b>Women in Quaternary Science Award</b> , Shlemon Center for Quaternary Sciences, one-semester stipend	2019
<b>Outstanding Student Award</b> , Association for Women Geoscientists	2019
<b>Anne Kirtland Selden Lowe Scholarship</b> , University of Wyoming, \$1,500	2019
<b>Page Jenkins Memorial Scholarship</b> , University of Wyoming, \$2,200	2019
<b>Geology &amp; Geophysics Meritorious Graduate Research Grant</b> , University of Wyoming, \$1,260	2018
<b>Walter Harrison and Constance Chatterton Spears Fellowship</b> , University of Wyoming, \$2,500	2018
<b>Bozanic Student Support</b> , University of Wyoming, \$1,000	2018
<b>S H Knight Geology Scholarship</b> , University of Wyoming, \$900	2018
<b>Outstanding Geology Senior Award</b> , University of Massachusetts	2017
<b>Linda G. Lockwood Environmental Science Scholarship</b> , University of Massachusetts	2017
<b>Education Award</b> , AmeriCorps, \$1,500	2016
<b>New York Farmers Scholarship</b> , University of Massachusetts, \$1,000	2016
<b>Angelo Tagliacozzo Memorial Geological Scholarship</b> , NEAIPG, \$2,000	2016
<b>Ascension Farms Scholarship</b> , University of Massachusetts, \$1,000, \$7,000	2014, 2016
<b>Dean's Award</b> , University of Massachusetts, \$2,000	2013–2016
<b>John &amp; Abigail Adams Tuition Waiver</b> , University of Massachusetts	2013–2016

## Organizations

<b>Cooperative Institute for Research in Environmental Sciences</b> , Graduate Student	2022–present
<b>American Geophysical Union</b> , Student Member	2019–2024
<b>European Geosciences Union</b> , Student Member	2022–2023
<b>Association for Women Geoscientists</b> , Student Member	2019
<b>American Institute of Professional Geologists</b> , Student Member	2017
<b>Phi Kappa Phi</b> , Student Member	2017
<b>University of Massachusetts Geosciences Club</b> , Vice President	2015–2017
<b>Phi Sigma Pi</b> , Student Member, Education Chair, Regional Delegate	2014–2017
<b>Geological Society of America</b> , Student Member	2014–2017