

ANNA RUTH W. HALBERSTADT

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RESEARCH EXPERTISE

Ice-sheet and climate modeling, marine geology, glaciology, geomorphology, paleoclimatology

EDUCATION

Ph.D., University of Massachusetts Amherst	2016-2022
Department of Geosciences (Research adviser: Rob DeConto)	
M.S., Rice University	2013-2016
Department of Earth Science (Research adviser: John Anderson)	
B.S., Rice University	2009-2013
B.S. Civil & Environmental Engineering; B.S. Earth Science	
Cumulative GPA: 3.84; cum laude	

PROFESSIONAL APPOINTMENTS

Postdoctoral Research Associate	
Berkeley Geochronology Center, University of California Berkeley	2022-2024

GRADUATE RESEARCH APPOINTMENTS

Graduate Research Assistant	
University of Massachusetts Boston, Greater Boston Research Advisory Group	2019-2021
<i>Developed state-of-the-art coastal flood projections for the City of Boston by combining ice-sheet modeling with a probabilistic sea level framework; co-authored report for policymakers.</i>	
Massachusetts Executive Office of Energy and Environmental Affairs	Fall 2017
<i>Produced sea-level rise maps and imagery for the State of Massachusetts, investigating the intersection of projected floodplains with regions of socioeconomic vulnerability.</i>	
University of Massachusetts Amherst, Department of Geosciences (PI: Rob DeConto)	2016-2021
<i>Reconstructed past ice-sheet behavior and stability using numerical modeling techniques.</i>	
Rice University, Department of Civil & Environmental Engineering (PI: Dan Cohen)	Spring 2016
<i>Assisted in investigating the role of coal power plants and ship fuel SO₂ emissions in contributing to the Northern Hemisphere 2015-2016 temperature anomaly.</i>	
Rice University, Department of Earth Science (PI: John Anderson)	2013-2016
<i>Investigated controls on glacial stability by reconstructing the deglacial history and evaluating ice-bed interactions in the Ross Sea, Antarctica.</i>	

FIELD CAMPAIGNS

IODP Expedition 379: Amundsen Sea West Antarctic Ice Sheet History	Jan-Mar 2019
International expedition aimed towards documenting ice-sheet dynamics in the Amundsen Sea throughout the history of the West Antarctic Ice Sheet, and connecting those data with other global and Antarctic records. I sailed as a sedimentologist; I analyzed and interpreted the recovered drill core, and assisted in writing preliminary reports and interpretations.	
McMurdo Dry Valleys, Antarctica	Nov 2016
International collaboration to assess Antarctic Ice Sheet climate sensitivity during the Miocene and integrate terrestrial records with marine data; fieldwork located at the Friis Hills (11/2 –	

11/25). I helped collect a permafrost drill core, interpreted nearby sedimentary records, and identified tephra deposits for establishing chronological control. (PI: Doug Kowalewski)

Ross Sea, Antarctica

Jan-Mar 2015

NSF-funded cruise to conduct a detailed multibeam survey and collect cores and seismic data in the western Ross Sea, Antarctica (01/23 – 3/20, 57 days, RV-IB Nathaniel B. Palmer). I helped collect and analyze marine geophysical data, multibeam swath bathymetry data, and sediment cores used to reconstruct glacial retreat history of the Ross Sea. (PIs: John Anderson, Phil Bart)

RESEARCH GRANTS

Halberstadt, A.R.W. (PI), *Antarctic ice-sheet dynamics constrained by high-resolution modeling and comprehensive continent-wide data benchmarks*. NSF Office of Polar Programs Postdoctoral Research Fellowship, \$254,790, 01/2022 – 12/2023.

Halberstadt, A.R.W. (PI), *Modeling the influence of orbital cyclicity, CO₂, and ocean temperatures on West Antarctic Ice Sheet contribution to Pliocene sea level*. International Ocean Drilling Program Expedition 379 Post Expedition Activity Award, \$17,966, 09/2020 – 11/2020.

MANUSCRIPTS IN REVIEW

Halberstadt, A.R.W., Balco, G., Buchband, H., Cosmogenic-nuclide data from Antarctic nunataks can constrain past ice sheet sensitivity to marine ice margin instabilities. Submitted to *The Cryosphere*.

PUBLICATIONS

Chorley, H., & 21 co-authors incl. **Halberstadt, A.R.W.**. East Antarctic Ice Sheet variability during the middle Miocene Climate Transition captured in drill cores from the Friis Hills, Transantarctic Mountains. *in press, GSA Bulletin*. ([link](#))

DeConto, R.M., Baranes, H., Woodruff, J. D., **Halberstadt, A.R.W.**, Kopp, R.E., 2022. Chapter 4: Sea Level Rise, in *Climate Change Impacts and Projections for the Greater Boston* report ([link](#))

Halberstadt, A.R.W., Kowalewski, D.E., DeConto, R.M., Reconciling marine Antarctic ice sheet fluctuations with the long-term stability of terrestrial deposits in the McMurdo Dry Valleys. *Geology*, 50(5), 557–561. ([link](#))

Dell, R., Banwell, A.F., Willis, I., Arnold, N., **Halberstadt, A.R.W.**, Chudley, T.R., Pritchard, H., 2022. Supervised classification of slush and ponded water on Antarctic ice shelves using Landsat 8 imagery. *Journal of Glaciology*, 68(268), 401-414. ([link](#))

Levy, R.H., & 25 co-authors incl. **Halberstadt, A.R.W.**, 2021. Antarctic Environmental Change and Ice Sheet Evolution through the Miocene to Pliocene – A perspective from the Ross Sea and George V to Wilkes Land Coasts. In: Florindo, F., Siegert, M., De Santis, L., and Naish, T. (eds) *Antarctic Climate Evolution*. 2nd ed. Amsterdam: Elsevier, 804. ([link](#))

Halberstadt, A.R.W., Chorley, H., Levy, R.H., Naish, T., DeConto, R.M., Gasson, E. and Kowalewski, D.E., 2021. CO₂ and tectonic controls on Antarctic climate and ice-sheet evolution in the mid-Miocene. *Earth and Planetary Science Letters*, 564, 116908. ([link](#))

Halberstadt, A.R.W., Gleason, C.J., Moussavi, M.S., Pope, A., Trusel, L.D., DeConto, R.M., 2020. Antarctic supraglacial lake identification using Landsat-8 image classification. *Remote Sensing*, 12(8), 1327. ([link](#))

Moussavi, M.S., Pope, A., **Halberstadt, A.R.W.**, Trusel, L.D., Cioffi, L., Abdalati, W., 2020. Antarctic supraglacial lake detection using Landsat 8 and Sentinel-2 imagery: Towards continental generation of lake volumes. *Remote Sensing*, 12(1), 134. ([link](#))

Gohl, K., Wellner, J.S., Klaus, A., and Expedition 379 Scientists incl. **Halberstadt, A.R.W.**, 2019. IODP Expedition 379 Preliminary Report: Amundsen Sea West Antarctic Ice Sheet History. *International Ocean Discovery Program Proceedings*. ([link](#))

- Judd, E.J., Ivany, L.C., DeConto, R.M., **Halberstadt, A.R.W.**, Miklus N.M., Junium, C.K., Uveges, B.T., 2019. Seasonally resolved proxy data from the Antarctic Peninsula support a heterogeneous middle Eocene Southern Ocean. *Paleoceanography and Paleoclimatology*, 34, 787–799. ([link](#))
- Halberstadt, A.R.W.**, Simkins, L.M., Anderson, J.B., Prothro, L.O., Bart, P.J., 2018. Characteristics of the deforming bed: till properties on the deglaciated Antarctic continental shelf. *Journal of Glaciology*, 64(248), 1014–1027. ([link](#))
- Greenwood, S.L., Simkins, L.M., **Halberstadt, A.R.W.**, Prothro, L.O., & Anderson, J.B., 2018. Holocene reconfiguration and readvance of the East Antarctic Ice Sheet. *Nature Communications*, 9(1), 3176. ([link](#))
- Simkins, L.M., Anderson, J.B., Greenwood, S.L., Gonnermann, H.M., Prothro, L.O., **Halberstadt, A.R.W.**, Stearns, L.A., Pollard, D., DeConto, R.M., 2017. Anatomy of a meltwater drainage system beneath the ancestral East Antarctic ice sheet. *Nature Geoscience*, 10, 691–698. ([link](#))
- Anderson, J.B., Simkins, L.M., Bart, P.J., De Santis, L., **Halberstadt, A.R.W.**, Olivo, E., Greenwood, S.L., 2017. Seismic and geomorphic records of Antarctic Ice Sheet evolution in the Ross Sea and controlling factors in its behavior, in: *Glaciated Margins: The Sedimentary and Geophysical Archive*, Geological Society London Special Publications. ([link](#))
- Halberstadt, A.R.W.**, Simkins, L.M., Greenwood, S.L., Anderson, J.B., 2016. Past ice-sheet behaviour: Retreat scenarios and changing controls in the Ross Sea, Antarctica. *The Cryosphere*, 10, 1003–1020. ([link](#))
- Cohan, D.S., Krakauer, N.Y., Corbett, J.J., Zhang, R., **Halberstadt, A.R.W.**, Parks, L.Y., 2016. Could cuts in sulfur from coal and ships help explain the 2015 spurt in Northern Hemisphere temperatures? *IEEE EarthZine*. ([link](#))

INVITED TALKS

AGU Fall Meeting 2022, Session C42B: Linking Glaciological Observations to Paleo Archives from Subglacial to Marine Environments (also see Conference Presentations)	12/15/2022
University of North Carolina, Dept. Earth, Marine, Environmental Sciences Seminar	11/4/2022
North Carolina State University, Marine, Earth, and Atmospheric Sciences Seminar	10/17/2022
Rice University, Earth, Environmental, and Planetary Sciences Seminar	2/4/2022
International Thwaites Glacier Collaboration: Early Career Workshop (<i>keynote</i>)	8/29/2019
International Ocean Drilling Program - Antarctic School	6/14/20
Harvard University, Department of Earth and Planetary Sciences	4/24/2019
Rice University, Department of Earth Science (JohnFest 2018)	4/20/2018
Columbia University, Lamont-Doherty Earth Observatory	5/23/2017
Worcester State University, Department of Earth, Environment, and Physics	10/11/2016

CONFERENCE PRESENTATIONS (SINCE 2016)

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- Halberstadt, A.R.**, Gasson, E., Pollard, D., DeConto, R.M., 2022. Transient simulations of Pliocene ice sheet dynamics in the Ross Sea, *AGU Fall Meeting*, 15 Dec. (*invited talk*)
- Halberstadt, A.R.**, Kowalewski, D.E., DeConto, R.M., 2021. Reconciling dynamic WAIS retreat during past warm periods with stable cold-polar landforms in the McMurdo Dry Valleys, *AGU Fall Meeting*, 16 Dec. (*eLightning*)
- Halberstadt, A.R.**, Balco, G., Pollard, D., DeConto, R.M., Gomez, N., Johnson, J., 2021. High-resolution ice-sheet modeling to reconcile abrupt mid-Holocene terrestrial thinning with earlier marine grounding-line retreat, *AGU Fall Meeting*, 13-17 Dec. (*poster*)
- Dell, R.L., Banwell, A., Arnold, N., Willis, I., **Halberstadt, A.R.**, Chudley, T., Pritchard, H., 2020. A record of slush and water extent on Antarctic ice shelves from 2013 to present day, *EGU 2020 General Assembly*, 27 Apr. (*talk*)

- Trusel, L.D., Pope, A., Moussavi, M.S., **Halberstadt, A.R.**, 2019. Dataset coming up: Antarctic-wide Supraglacial lake extent and depth using Landsat 8 and Sentinel-2, 2013-2019, *AGU Fall Meeting*, 9-13 Dec. (*poster*)
- Halberstadt, A.R.**, Chorley, H.K., DeConto, R.M., Naish, T.R., Levy, R.H., Gasson, E.G.W., Kowalewski, D.E., 2019. Model-data integration to explore mid-Miocene climate and ice-sheet variability, *Interdisciplinary Antarctic Earth Sciences Conference*, Julian, CA, 13 Oct. (*invited talk*)
- Halberstadt, A.R.**, 2019. Integrating ice-sheet modeling and geologic data, *ITGC Early Career Workshop*, Bury St Edmunds, Suffolk, UK, 29 Aug. (*invited talk*)
- Moussavi, M., Pope, A., **Halberstadt, A.R.**, Trusel, L.D., 2018. Monitoring and classifying supraglacial lake volumes in Antarctica from a suite of satellite observations, *AGU Fall Meeting*, 10-14 Dec. (*poster*)
- McKnight, S., & 15 co-authors incl. **Halberstadt, A.R.**, 2018. Talking the talk AND walking the walk: UMass Geosciences' community-based efforts to increase diversity and inclusivity through improved department climate, *AGU Fall Meeting*, 10-14 Dec. (*poster*)
- Halberstadt, A.R.**, Moussavi, M., Pope, A., Trusel, L.D., Gleason, C.J., DeConto, R.M., 2018. Exploring surface meltwater classification techniques from multispectral imagery over the Antarctic Ice Sheet, *AGU Fall Meeting*, 10-14 Dec. (*poster*)
- DeConto, R.M., Kopp, R., Kulp, S., Pollard, D., Strauss, B., **Halberstadt, A.R.**, Gilford, D., Ashe, E., 2018. Rapid ice-sheet retreat and local sea-level rise projections: reducing uncertainty within a probabilistic framework, NSF PREEVENTS Meeting, 20-21 Sept. (*poster*)
- Halberstadt, A.R.**, DeConto, R.M., Gasson, E.G.W., Kowalewski, D.E., Levy, R.H., Naish, T.R., Chorley, H.K., 2018. Modeling Antarctic climate and ice-sheet variability in the mid-Miocene, *SCAR/IASC POLAR-2018*, Davos, Switzerland, 19 June. (*talk*)
- Halberstadt, A.R.**, DeConto, R.M., Gasson, E.G.W., Kowalewski, D.E., Levy, R.H., Naish, T.R., Chorley, H.K., 2017. Reconciliation of Antarctic marine and terrestrial geologic records: climate and ice-sheet variability in the mid-Miocene, *AGU Fall Meeting*, 11-15 Dec. (*poster*)
- Judd, E.J., Ivany, L.C., Miklus, N.M., Uveges, B.T., Junium, C.K., **Halberstadt, A.R.**, DeConto, R.M., 2017. Eocene Antarctic seasonality inferred from high-resolution stable isotope profiles of fossil bivalves and driftwood, *AGU Fall Meeting*, 11-15 Dec. (*poster*)
- Anderson, J.B., Simkins, L.S., Greenwood, S.L., Demet, B.P., **Halberstadt, A.R.**, and Prothro, L.O., 2017. Role of grounding zone wedges in grounding line stabilization: Case Study from Ross Sea, *Geological Society of America*, Seattle, WA, 22-25 Oct. (*talk*)
- Halberstadt, A.R.**, and DeConto, R.M., 2017. WAIS sensitivity to sub-ice-shelf bathymetry during the last glacial cycle: model-data convergence in the Ross Sea, *Past Antarctic Ice Sheet Dynamics (PAIS) Conference*, Trieste, Italy, 10-15 Sept. (*poster*)
- Kowalewski, D.E., and **Halberstadt, A.R. (presenting author)**, 2016. Friis Hills glacial history: an international collaboration to examine the Miocene in Antarctica, *AGU Fall Meeting*, 12-16 Dec. (*talk*)
- Halberstadt, A.R.**, Simkins, L.M., Anderson, J.B., Prothro, L.O., Demet, B.P., Greenwood, S.L., Yokoyama, Y., 2016. Post-LGM retreat history in Ross Sea reflects changing controls on marine ice-sheet behavior, *AGU Fall Meeting*, 12-16 Dec. (*poster*)

TEACHING

Instructor of record (UMass-Amherst)

Antarctica: The Coolest Continent (NATSCI 191-01 & 02) Fall 2020

Summer school instructor (Oregon State University)

International Ocean Discovery Program - Glacial Sedimentation School 22-27 May 2022

Teaching assistant (UMass-Amherst)

Physical Oceanography, incl. lab (GEOSCI 595) Fall 2018

(Assisted) Intro. to Climate & Environmental Modeling (GEOSCI 591) Fall 2019

Guest lecturer

Antarctic Ice Sheet Dynamics (GY 400), Colorado College	11/15/2020
Glaciers and Ice Sheets (EVSC 7559), University of Virginia	10/25/2019
Glacial Geology (GEOSCI 563), UMass-Amherst	2016, 2018

FORMAL RESEARCH MENTORSHIP

Raini Helmstadter (2020 B.A. Hampshire College, thesis research co-adviser: 'Future Climate Change in New Mexico: Climate division-scale RCM projections guided by impact-oriented pedagogy')

Emma Robertson (2020 B.S. UMass-Amherst: Independent research project comparing modern modeled Antarctic mass loss with satellite records)

Kelsey Crocker (2015 B.S. Rice University: Independent research project on iceberg furrows and catastrophic ice stream collapse)

ACADEMIC SERVICE & INVOLVEMENT

Journal referee

Communications Earth & Environment (2022), Nature Reviews Earth & Environment (2022), The Cryosphere (2022), Geology (2021), Quaternary Research (2016)

Proposal reviewer

NSF Office of Polar Programs (panelist, 2022)

NSF Office of Polar Programs (reviewer, 2022)

Conference session convener

Scientific Committee on Antarctic Research - Open Science Conference 2022 Co-convenor, *Antarctic ice sheet behaviour from marine and terrestrial records*

AGU Fall Meeting 2021 Co-convenor, Session PP022: *Past Climate, Ice Sheet and Sea-Level Changes: How Much, How Fast?*

AGU Fall Meeting 2020 Co-convenor, Session GC068: *Climate Modeling for Everyone: Interdisciplinary Research to Address Social Justice and (More-Than)Human Impacts*

AGU LANDInG (Leadership Academy and Network for Diversity and Inclusion in the Geosciences) cohort of NSF Postdoctoral Research Fellows (2022-2024)

Unlearning Racism in Geoscience (URGE) pod member, UMass-Amherst (2021-2022)

Moderator, UMass School of Earth & Sustainability panel on [IPCC SROCC](#) report (11/5/2019)

PUBLIC ENGAGEMENT & EDUCATION

Science communication:

Halberstadt et al 2022 [press release](#)

Halberstadt et al 2021 [press release](#)

Classroom involvement

Collaborated with high-school teachers to build multidisciplinary series of lesson plans that includes the physics, biology, and solutions related to climate change in the Antarctic.

Published curriculum (2021) <https://cires.colorado.edu/outreach/programs/antarctica-connecting-climate-change-melting-ice-shelves-and-pooing-penguins>

IODP related school outreach: visited two elementary-school classrooms before and after Expedition 379, and maintained connection with students onboard (2018-2019)

<http://winchester.wickedlocal.com/news/20181214/geoscientist-visits-acera-school-in-winchester>

Community engagement

Greater Boston Research Advisory Group

Eureka, Girls Inc! STEM workshops

2019-2021

July 2018, 2019

Featured on 'Time Scavengers' website https://timescavengers.blog/	7/30/2018
Guest host, Science Trivia Night, The Quarters	4/2/2018
Science Fair Judge, Westfield High School	2/8/2018
Guest scientist, 'Lab Talk with Laura' radio show, WMUA 91.1 FM	1/23/2018
Participant, Communicating Science to Non-Experts workshop	Spring 2016