

SOPHIE COULSON

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Hinds Laboratory,
Department of Geophysical Sciences,
University of Chicago

POSITIONS

- 2026 - **Assistant Senior Instructional Professor**, Department of Geophysical Sciences, Physical Sciences Division, University of Chicago, USA
- 2023 - 2026 **Assistant Professor of Geophysics**, Department of Earth Sciences, College of Engineering and Physical Sciences, University of New Hampshire, USA
- 2021 – 2023 **Director's Postdoctoral Fellow**, Los Alamos National Laboratory, USA
Proposal Title: "Climate Change-induced Seismicity? Quantifying the Impact of Ice and Ocean Loading on Crustal Stress and Seismicity in the Russian Arctic"
- 2021 **Part-time Graduate Research Assistant**, Los Alamos National Laboratory, USA
Contributed to early stages of developing a framework to incorporate a sea-level model within a global climate model
Advisor: Dr. Matthew Hoffman

EDUCATION

- 2016 – 2021 **Harvard University, USA**
PhD in Earth and Planetary Sciences

"Geodynamic Insights on Critical Climate Events in Earth History"
Thesis Advisor: Prof. Jerry X Mitrovica
- 2012 – 2016 **University of Liverpool, UK**
MESci Geophysics (North America) (with First Class Honors)
Integrated Masters and Bachelors with a year in North America

"Modelling Guided Waves in the Alaskan-Aleutian Subduction Zone"
Thesis Advisor: Prof. Andreas Rietbrock
- 2014 – 2015 **McGill University, Canada**
Visiting Student, Department of Earth and Planetary Sciences

AWARDS AND FELLOWSHIPS

- 2024 *Geophysical Research Letters – Most Read Paper* for Coulson et al., 2021, "The Global Fingerprint of Modern Ice-Mass Loss on 3-D Crustal Motion".
- 2021 - 2023 *Director's Postdoctoral Fellowship*, Los Alamos National Laboratory
- 2020 *Earth and Planetary Science Teaching Award* for "A Brief History of the Earth", Harvard University
- 2017, 2018 Harvard Bok Center's *Certificate for Distinction in Teaching*
- 2016 - 2018 *Frank Knox Memorial Fellowship*
- 2016 *James Mills Peirce Fellowship*, Harvard University
- 2016 *University of Liverpool Undergraduate Geophysics Prize*
- 2016 *British Geophysical Association Undergraduate Prize* for outstanding theses
- 2012 Scarborough Sixth Form College's *Glauert Award* for highest achieving female in mathematics

PUBLICATIONS

*Authors contributed equally; †Indicates graduate student advisee

- 2026 **Coulson, S.**, Lloyd, A., Bao, X. Mitrovica, J. X., Dangendorf, S., Pan, L., Valencic, N., Tamisiea, M. E., Al-Attar, D., Heathcotte, D., Inverting sea surface height data yields Greenland ice mass changes (1993–2019): a proof of concept *Geophysical Journal International* 246(2), p.ggag187.
<https://doi.org/10.1093/gji/ggag187>
- 2026 †**Ertel, G., Coulson, S.**, Piecuch, C., Hoffman, M., Crustal deformation and gravitational effects from dynamic ocean mass redistribution impact projected sea-level change. *Geophysical Research Letters* 53(11), p.e2026GL122243. <https://doi.org/10.1029/2026GL122243>
- 2026 Gangadharan, N., **Coulson, S.**, Delbridge, B., †**Ertel, G.**, Moise, A., Palmer, M., Does Geocentric Sea-Level Rise in the Maritime Continent Reveal a Tectonic Fingerprint? *Geophysical Research Letters* 53(10), p.e2026GL122469. <https://doi.org/10.1029/2026GL122469>
- 2026 ***Coulson, S.**, *Leary, R., Continental levering explains up to~ 30% variation in magnitude of Pennsylvanian sea-level cycles recorded in cyclic stratigraphy. *Geology* 54(6), pp.598-602.
<https://doi.org/10.1130/G54320.1>
- 2025 Parazin, B., Gomez, N., Richards, F., Hoggard, M.J., **Coulson, S.**, Mitrovica J. X., Ice Sheets Without Dynamic Topography. *Geophysical Research Letters* 52(19), p.e2025GL115332.
<https://doi.org/10.1029/2025GL115332>
- 2025 Yoo, M., Gopalan, G., Hoffman, M., **Coulson, S.**, Han, H.K., Wilke., C.K., Hillebrand, T., Emulation with uncertainty quantification of regional sea-level change caused by the Antarctic Ice Sheet. *Journal of Geophysical Research: Machine Learning and Computation* 2(2), p.e2024JH000349.
<https://doi.org/10.1029/2024JH000349>
- 2025 Coonin, A., Lau, H.C.P., **Coulson, S.**, Meltwater Pulse 1A sea-level-rise patterns explained by global cascade of ice loss. *Nature Geoscience*, 1-6. <https://doi.org/10.1038/s41561-025-01648-w>
- 2025 Reilly, J., Latychev, K., **Coulson, S.**, Mitrovica, J.X., Glacial hydro-isostatic adjustment at mid-ocean ridges. *Geophysical Journal International* 240(1), 550-558. <https://doi.org/10.1093/gji/ggae390>
- 2023 Richards, F.D., **Coulson, S.**, Hoggard, M.J., Austermann, J., Dyer, B., Mitrovica, J.X., Geodynamically corrected Pliocene shoreline elevations in Australia consistent with midrange projections of Antarctic ice loss. *Science Advances* 9 (46), p.eadg3035.
<https://www.science.org/doi/full/10.1126/sciadv.adg3035>
- 2023 ³Borreggine, M., Latychev, K., **Coulson, S.**, Powell, E., Mitrovica, J.X., Milne, G.A., Alley, R.B., Sea-Level rise in Southwest Greenland as a contributor to Viking abandonment. *Proceedings of the National Academy of Sciences* 120 (17), e2209615120. <https://doi.org/10.1073/pnas.2209615120>
- 2022 ²**Coulson, S.**, Dangendorf, S., Mitrovica, J.X., Tamisiea, M.E., Pan, L., Sandwell, D.T., A Detection of the Sea Level Fingerprint of Greenland Ice Sheet Melt. *Science* 377 (6614), 1550-1554.
<https://www.science.org/doi/full/10.1126/science.abo0926>
- 2022 Onac, B.P., Mitrovica, J.X., Ginés, J., Asmerom, Y., Polyak, V.J., Tuccimei, P., Fornós, J.J., Hoggard, M.J., Ashe, E.L., **Coulson, S.**, Ginés, A., Soligo, M., Villa, I.M., Exceptionally stable pre-industrial sea-level

inferred from the western Mediterranean Sea, *Science Advances* 8 (26), p.eabm6185.
<https://www.science.org/doi/10.1126/sciadv.abm6185>

- 2021 ¹**Coulson, S.**, Lubeck, M., Mitrovica, J.X., Powell, E., Davis, J.L., Hoggard, M., The Global Fingerprint of Modern Ice-Mass Loss on 3-D Crustal Motion, *Geophysical Research Letters* 48 (16), p.e2021GL095477. <https://doi.org/10.1029/2021GL095477>
- 2021 **Coulson, S.**, Al-Attar, D., Mitrovica, J.X., An Extended Ice-Age Sea-Level Equation: Incorporating Water Flux Across Sills, *Geophysical Journal International*, 225 (1), 236-252.
<https://doi.org/10.1093/gji/ggaa596>
- 2020 Mitrovica, J.X., Austermann, J., **Coulson S.**, Creveling, J.R., Hoggard, M.J., Jarvis, G.T., and Richards, F.D., Dynamic Topography and Ice Age Paleoclimate, *Annual Review of Earth and Planetary Sciences* 48, 585-621. <https://doi.org/10.1146/annurev-earth-082517-010225>
- 2019 **Coulson, S.**, Pico, T., Austermann, J., Powell, E., Moucha, R., Mitrovica, J.X., The role of isostatic adjustment and gravitational effects on the dynamics of the Messinian salinity crisis, *Earth and Planetary Science Letters* 525, 115769. <https://doi.org/10.1016/j.epsl.2019.115760>
- 2018 Rowe, C.D., Ross, C., Swanson, M.T., Pollock, S., Backeberg, N.R., Barshi, N.A., Bate, C.E., Carruthers, C., **Coulson, S.**, Dascher-Cousineau, K., Harrichhausen, N., Peña Castro, A. F., Nisbet, H., Rakoczy, P., Scibek, J., Smith, H., Tarling, M. S., Timofeev, A., Young, E., Geometric complexity of earthquake rupture surface preserved in pseudotachylite networks, *Journal of Geophysical Research: Solid Earth* 123 (9), 799-8015. <https://doi.org/10.1029/2018JB016192>
- 2018 **Coulson, S.**, Garth, T., Rietbrock, A., Velocity structure of the subducted Yakutat terrane, Alaska: Insights from guided waves, *Geophysical Research Letters* 45 (8), 3420-3428.
<https://doi.org/10.1002/2017GL076583>

¹Highlighted in *Nature Research Highlights*, August 2021 <https://www.nature.com/articles/d41586-021-02285-0>

²Covered by NBC News and others, September 2022 <https://www.nbcnews.com/science/environment/discovery-fingerprint-confirms-alarming-predictions-greenland-ice-shee-rcna50029>

³Covered by The Washington Post and others, April 2023 <https://www.washingtonpost.com/climate-environment/2023/04/28/vikings-greenland-sea-level-rise-climate/>

AWARDED GRANTS

Canadian Nuclear Safety Commission, “Investigating the effects of glacial stresses on the reactivation potential of faults in eastern Canada: implications for deep geological repository sites”, Lead PI: G. Milne, UNH PI: **S. Coulson**, \$119,474.50 CAD (2026-2027)

NSF Major Research Instrumentation, “Equipment: MRI: Track #1 Acquisition of a computer cluster for the study of fluids and plasmas on Earth and beyond”, PI: F. Foucart, Co-PI: **S. Coulson**, K. Germaschewski, J. Oshi and R.T. Letscher, \$784,649 (2025-2028)

INVITED CONFERENCE TALKS

Apr 2024	Coulson S. , Global to Local Sea-Level Rise Panel Discussion Speaker, From Ice Sheets to Coast: Sea Level Rise Impacts Workshop, University of Houston.
Apr 2023	Coulson S. , Dangendorf, S., Mitrovica, J.X., Tamisiea, M.E., Pan, L., Sandwell, D.T., A Detection of the Sea Level Fingerprint of Greenland Ice Sheet Melt, European Geosciences Union General Assembly 2023, Vienna.
Feb 2020	Coulson, S. , Pico, T., Austermann, J., Powell, E., Moucha, R., Mitrovica, J.X., The role of isostatic adjustment and gravitational effects on the dynamics of the Messinian salinity crisis, MEDSALT Final Symposium, Piran, Slovenia.
Jan 2020	Coulson, S. , Austermann, J., Hoggard, M., Richards, F., Borreggine, M.J., Mitrovica, J.X., The role of dynamic topography on glacial inception in North America, ASPECT Virtual User Meeting 2020.

INVITED SEMINARS

Sep 2025	Physics and Astronomy Colloquium, University of New Hampshire.
Mar 2025	Earth Science Seminar, Departments of Earth, Atmosphere and Planetary Sciences, MIT.
Feb 2025	Lamont-Doherty Earth Observatory Geodynamics Seminar, Columbia University.
Feb 2025	Department of Earth Sciences Seminar, Dartmouth College.
Nov 2024	Talks on GIA Seminar (joint talk with Roland Bürgmann), Online Seminar Series hosted by IAG/IACS subcommission 3.4, SCAR-INSTANT Theme 2, and PALSEA-Next.
Nov 2024	Department of Earth & Environmental Sciences Seminar, Boston College.
Apr 2024	Department of Geosciences Colloquium, Stony Brook University.
Mar 2024	UTIG Special Seminar, University of Texas, Austin.
Mar 2024	Integrated and Applied Mathematics Fall Seminar Series, University of New Hampshire.
Feb 2024	Ice+Climate Seminar, Dartmouth Engineering, Dartmouth College.
Nov 2022	Berkeley Seismo Lab Seminar, University of California, Berkeley.
Nov 2022	Institute for Geophysics and Planetary Physics Seminar, University of California, Santa Cruz.
Sep 2022	Department of Geophysical Sciences Seminar, University of Chicago.
May 2022	Department of Earth Sciences Special Seminar, University of New Hampshire.
Apr 2022	School of Earth and Environmental Sciences Special Seminar, Cardiff University, UK.
Mar 2022	Department of Earth and Environmental Science Colloquium, New Mexico Tech.
Sep 2021	Department of Earth and Planetary Sciences Seminar, University of New Mexico.
Mar 2021	Los Alamos National Laboratory Climate, Ocean and Sea Ice Modeling Seminar.

WORKSHOP ATTENDANCE

2021	Python for Scientists and Engineers, Enthought Course, Virtual
2019	ASPECT Hackathon, Computational Infrastructure for Geophysics, Heber City, Utah
2018	ASPECT Hackathon, Computational Infrastructure for Geophysics, Petaluma, California (ASPECT: Advanced Solver for Problems in Earth's ConvecTion)

TEACHING

2026	Instructor for ENSC 36100 - <i>Environmental Data Science I</i> - University of Chicago
2026	Instructor for ESCI 998 – <i>Proposal Development</i> - University of New Hampshire
2025	Instructor for ESCI 997 – <i>Seminar in Earth Sciences</i> - University of New Hampshire
2025	Instructor for ESCI 896 – <i>Topics in Geodynamics</i> - University of New Hampshire
2025	Instructor for ESCI 795/895 – <i>Sea Level Change and Geodynamics</i> - University of New Hampshire
2024 - 2026	Instructor for ESCI 402 – <i>Earth History</i> - University of New Hampshire
2024	Co-instructor for ESCI 895 – <i>Southwest US Field Course</i> - University of New Hampshire
2023, 2024	Instructor for ESCI 734/834 – <i>Global Geophysics</i> - University of New Hampshire
2020	Invited Guest Seminar Speaker for GY400 - <i>West Antarctic Ice Sheet History and Dynamics</i> - Colorado College
2020	Teaching Fellow for EPS 52 – <i>Introduction to Global Geophysics</i> - with Prof. Jerry X Mitrovica, Harvard University
2018, 2020	Teaching Fellow and Head TF for EPS 10 – <i>A Brief History of the Earth</i> - with Prof. Jerry X Mitrovica, Harvard University
2019	Graduate Student Field Trip Leader (8 days in Mt Baker, Olympic Peninsula and Mt Rainier, Washington), Department of Earth and Planetary Sciences, Harvard University
2017	Teaching Fellow for EPS 10 – <i>A Brief History of the Earth</i> - with Prof. Jerry X Mitrovica, Harvard University

MENTORSHIP

Graduate Students:

2025 -	Primary Advisor for Jordan DiPrima, Earth Sciences MSc Student, University of New Hampshire.
2025 - 2026	Primary Advisor for Ben Carlson, Earth and Environmental Sciences PhD Student, University of New Hampshire. <i>Transferred to University of Ottawa.</i>
2023 -	Primary Advisor for Grace Ertel, Earth and Environmental Sciences PhD Student, University of New Hampshire.

Undergraduate Students:

2026 -	Undergraduate Student Research Experience Advisor for Lucas Furlong, Earth Science (Geophysics) Undergraduate Student, University of New Hampshire.
2024 -	Undergraduate Thesis Co-Advisor for Jordan DiPrima, Earth Science (Geophysics) Undergraduate Student, University of New Hampshire.

Highschool Students:

2020	Short-term Summer Student Adviser for Talon Flodman '25, Harvard University.
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SCIENTIFIC SERVICE

2026	Instructor for the WHOI/NASA Summer School in Sea Level Science, Woods Hole.
2025	Participated in press activity surrounding the 2025 York Harbor, Maine Earthquake, including interviews with Boston Globe , Portsmouth Herald , UNH Today , WMUR and NHPR.
2024	Panel Reviewer for NASA ROSES 2024 Proposals
2024 -	Member of International Association of Geodesy Working Group 1.2.3: Geophysical Models
2023 -	Proposal Reviewer for <i>Marsden Fund</i> , <i>Royal Society Te Apārangi</i> and <i>Simons Foundation</i>
2023	Author of <i>Real Clear Science</i> Article “Did Rising Seas Force Vikings to Abandon Greenland Settlements?” (https://www.realclearscience.com/articles/2023/05/11/did_rising_seas_force_vikings_to_abandon_greenland_settlements_898735.html)
2021 –	Reviewer for <i>Science Advances</i> , <i>Earth and Planetary Science Letters</i> , and <i>Geochemistry Geophysics Geosystems</i>
2020 - 2022	Session Primary or Co-convenor AGU Fall Meeting 2020, 2021, 2022
2020	Contributing Author for PALSEA Express Workshop Report (published in <i>PAGES Magazine</i> , https://doi.org/10.22498/pages.28.2.67)

UNIVERSITY SERVICE

2025	Co-organizer of New Undergraduate Student Lunches, Department of Earth Sciences, University of New Hampshire
2025 - 2026	Department of Earth Sciences Student Research and Field Experiences Awards Committee Member, University of New Hampshire
2023 - 2026	Community Engagement & Safety Committee Member, Department of Earth Sciences, University of New Hampshire
2023 - 2026	Co-lead of the Department of Earth Sciences need-based field gear fund (Brewitt Gear Fund), University of New Hampshire
2019 – 2021	Diversity, Inclusion and Belonging Committee Member, Department of Earth and Planetary Sciences, Harvard University

OUTREACH

2023, 2025	Exhibitor at Ocean Discovery Day, University of New Hampshire
2023	Workshop Leader at GEAR UP New Mexico Girls STEM Pathways Conference for girls in 7 th -8 th grades, “Explore How Glaciers Move and Melt”, Crown Plaza, Albuquerque
2022	Workshop Assistant at STEM Santa Fe, Summer STEM Circles, “Sky is Not the Limit – Aviation and Aerospace”, Santa Fe Regional Airport
2021	Panelist for Royal Astronomical Society Early Career Network Event “Getting the Most Out of Your PhD”, Virtual
2021	Workshop Leader at STEM Pathways for Girls Conference for girls in 5 th -8 th grades, “Explore How Glaciers Move and Melt”, Santa Fe Community College
2020	Panelist for Harvard Graduate School Application Workshop (designed for URM students), Virtual

LANGUAGES AND SKILLS

English (native), Matlab, UNIX/Bash/CSH, C/C++, Fortran, Python, LATEX