

Claire C. Treat

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Education

- 2014 **Ph.D.**, Earth and Environmental Sciences, University of New Hampshire, Durham, NH, USA
Dissertation: “Effects of climate change on carbon and nitrogen cycling in permafrost soils of Alaska.”
Advisors: Dr. Wil Wollheim and Dr. Steve Frolking
- 2010 **M.S.**, Earth Sciences, University of New Hampshire, Durham, NH, 2010.
Thesis: “Modeling permafrost stability in peatlands with climate change and disturbance.”
Advisor: Dr. Steve Frolking
- 2005 **B. A.**, Environmental Science, *Magna cum laude*, Mount Holyoke College, South Hadley, MA, 2005.
Honors thesis: “Time scale dependence of methane emissions from a temperate fen”
Advisor: Dr. Jill Bubier

Research appointments

- 2020 - ongoing **Junior Research Group Leader, Permafrost Region Greenhouse Gas Flux**
Alfred Wegener Helmholtz Institute for Polar and Marine Studies, Permafrost Research Section,
Potsdam, Germany
- 2019 – 2020 **Research Scientist II**
University of New Hampshire, Durham, NH, USA, Earth Systems Research Center, Institute for
the Study of Earth, Oceans, and Space
- 2017 – 2019 **Post-Doctoral Research Fellow**
University of Eastern Finland, Kuopio, Finland, Department of Environmental and Biological
Sciences, Biogeochemistry Research Group
- Fall 2016 **Visiting Research Scientist**
Max Planck Institute for Meteorology, Hamburg, Germany, Land In the Earth System
- 2014 – 2016 **Post-Doctoral Research Fellow**
University of Alaska Fairbanks, Fairbanks, AK, USA, Institute for Northern Engineering
- 2014 – 2016 **Visiting Research Scientist**
U.S. Geological Survey, Menlo Park, CA, USA, Soil Biogeochemistry Lab
- 2013 – 2014 **Graduate School Dissertation Year Fellow**
University of New Hampshire, Durham, NH, USA,
Natural Resources, Earth & Environmental Science PhD Program
- 2010 – 2013 **U.S. Department of Energy Office of Science Graduate Fellow**
University of New Hampshire, Durham, NH, USA,
Natural Resources, Earth & Environmental Science PhD Program
- 2008 – 2010 **Research and Discover Graduate Fellow**
University of New Hampshire, Durham, NH, USA, Department of Earth Sciences
- 2006 – 2008 **Research Lab Manager**
Michigan State University, East Lansing, MI, USA, Department of Plant Biology
- 2005 – 2006 **Research Assistant**
Mount Holyoke College, South Hadley, MA, USA, Department of Earth & Environment

Awards

- 2021 AGU Editors’ Citation for Excellence in Refereeing, JGR-Biogeosciences
- 2010 Pink Triangle Award for Service, Presidents Commission on LGBT, U. New Hampshire
- 2005 Environmental Studies Outstanding Scholar Award, Mount Holyoke College, USA
- 2005 Excellence in Undergraduate Student Research, University of New Hampshire, USA

Research Funding

- EU Commission: Governance, “MISO: Autonomous Multi-Format In-Situ Observation Platform for Atmospheric Carbon Dioxide and Methane Monitoring in Permafrost & Wetlands”, 2022 - 2026 (€328,288)
- **Starting Grant, European Research Council**, “FluxWIN: The role of non-growing season processes in the methane and nitrous oxide budgets in pristine northern ecosystems.” ERC-2019-STG, 2020-2025 (€1,577,819).
- Graduate Fellowship, U.S. Department of Energy Office of Science, “The Great Northern Carbon Bomb? Impacts of permafrost thaw on carbon storage and loss in peatlands,” 2010-2013 (\$150,000).
- Dissertation Year Fellowship, “Effects of climate change on carbon and nitrogen cycling in permafrost soils,” University of New Hampshire Graduate School, 2013- 2014 (\$17,000).
- Creation of the Peat Core Processing Center, Iola K. Hubbard Climate Change Endowment, Earth Systems Research Center, Institute for the Study of Earth, Oceans, and Space, 2012 (\$10,000)

Student Supervision and Teaching Experience

- **PhD Student supervision:** 3 current / 0 completed, AWI
- **Masters thesis supervision:** 1 current / 3 completed, AWI
- **Bachelors thesis supervision:** 2 current / 1 completed, AWI
- Permafrost Landscapes, Department of Geo-ecology, University of Potsdam, Germany, Fall 2021, 2022 (1-2 seminars per semester)
- **Environmental Modeling**, Lead lecturer, Department of Biological and Environmental Sciences, University of Eastern Finland, Spring 2018
- Lecturer, Seminar on Biosphere-Atmosphere Interactions, Dept. of Biological and Environmental Sciences, University of Eastern Finland, 2017-2019 (1-2 seminars per semester)
- Mentoring and supervision of undergraduate research assistants (4 students), Earth Systems Research Center, University of New Hampshire, 2011-2014

Professional activities

- **Journal referee** for Nature Climate Change, Nature Geosciences, Agriculture and Forest Meteorology, Biogeochemistry, Biogeosciences, Bulletin of the American Meteorological Society (BAMS), Earth Science Reviews, Ecological Applications, Ecological Indicators, Ecosphere, Environmental Research Letters, FEMS Microbial Ecology, Geophysical Research Letters, Global Biogeochemical Cycles, Global Change Biology, Journal of Geophysical Research-Biogeosciences, Journal of Quaternary Science, Limnology & Oceanography, Permafrost and Periglacial Processes, Plant and Soil, PlosONE, Polar Research, Quaternary Science Reviews, Scientific Reports, Science of the Total Environment, Soil Biology and Biochemistry, Wetlands.
- Grant panelist, Earth Systems Science Division, U.S. Department of Energy, USA, May 2022
- Ad-hoc grant reviewer, NSERC, 2022
- Advisory Board “Regional Carbon Cycle Assessment and Processes-2” (RECCAP2) 2019-2021
- Advisory Board, International Permafrost and Carbon budgets interest group (IPaC), 2019-present
- Steering Committee, Permafrost Carbon Network, 2019 - present
- Working group leader, International C-Peat Research Network, Buried Peat Working Group, 2015-2018
- Working group leader, International Permafrost Carbon Network, Carbon Quality Working Group, 2013-2016
- Ad-hoc grant reviewer, Division of Environmental Biology, National Science Foundation, USA, 2019 (3 proposals)
- Ad-hoc grant reviewer, Arctic System Science, National Science Foundation, USA, November 2018
- Ad-hoc grant reviewer, NERC, UK, 2018, 2021, 2022
- Ad-hoc grant reviewer, NWO Science, The Netherlands, February 2018

- Grant panelist, U.S. Department of Energy, Rockville, MD, USA, May 2016
- Ad-hoc grant reviewer, National Science Foundation, USA, October 2015

Professional memberships

2005- present American Geophysical Union
 2011- present Permafrost Carbon Network (*international research network*)
 2011- present Permafrost Young Researchers Network
 2017- 2018 Society for Wetland Scientists

Organization of Scientific Workshops & Events

- Invited expert on the Permafrost Carbon Feedback, Workshop “The case for a coordinated Global Greenhouse Gas Monitoring Infrastructure,” World Meteorological Organization, Geneva, 10-12 May 2022
- Panel Moderator, Webinar on Permafrost and Tipping Points in the Earth System, Hosted by The Earth Commission (>200 participants), January 2022
- Panel organizer, Paleo perspectives on Permafrost Carbon, Permafrost Carbon Network Annual Meeting, November 2021
- Participant, SEARCH Methane Workshop, Seattle, March 2017.
- Session chair, Vulnerability of Permafrost Carbon, AGU Fall Meeting, December 2016.
- Working group chair, C-Peat Workshop, San Francisco, December 2016.
- Working group chair, C-Peat Workshop, San Francisco, December 2015.
- Working group chair, Permafrost Carbon Network Working Group Meeting, May 2015.
- Permafrost RCN Working Group Meeting, Fort Meyers, FL, May 2013.
- Permafrost RCN Workshop, San Francisco, CA, December 2012.

Professional Development

- Helmholtz Leadership Training, “Leading your research group”, 2021-2022.
- Improving PhD Student Supervision Workshop, AWI, October 2021
- Employee-Supervisor Review Training, AWI, April 2021.
- The Flipped Classroom: Workshop on effective teaching methods, Kuopio, September 2017.
- Carbon-climate connections in the earth system, ASP Summer School and Colloquium, National Center for Atmospheric Research, Boulder, CO, August 2013.
- Radiocarbon in Ecosystems Short Course, UC Irvine, July 2011.
- Geographic Information Systems Short Course, University of New Hampshire, August 2009.
- Stable Isotope Biogeochemistry Short Course, Michigan State University, May 2008

Service and other activities

- Chair & Founder, Young & Young at Heart Scientist Monthly Brown-bag Lunch Series, U.S.G.S., Menlo Park, April 2015 – July 2016.
- Advisor, Building Diversity in Science, a Bay-Area non-profit dedicated to a diverse STEM workforce, July 2015 – June 2016. <http://www.diversityinscience.org/>
- Graduate Student Representative, President’s Commission on the Status of Women, University of New Hampshire, 2009 – 2012.
- Chair, Stonewall Grads (Student Organization), University of New Hampshire, 2009 – 2013.
- Clerk, Graduate Student Organization, University of New Hampshire, 2008 - 2009
- Graduate Student Representative, Student Affairs Committee, University of New Hampshire, 2008 - present
- Academic Mentor to the Greek Community, University of New Hampshire, 2009

Publicly available data products

1. **Treat, C. C.**, et al. (2016). Synthesis dataset of physical and ecosystem properties from pan-arctic wetland sites using peat core analysis. PANGAEA Dataset #863697. <https://doi.pangaea.de/10.1594/PANGAEA.863697>.
2. **Treat, C. C.**, Bloom, Anthony A; Marushchak, Maija E (2018): Cumulative growing season, non-growing season, and annual methane fluxes from temperate, boreal, and tundra wetlands and uplands. PANGAEA Dataset #886976, <https://doi.pangaea.de/10.1594/PANGAEA.886976>.
3. **Treat, C.C.**, et al. (2019): Widespread global peatland establishment and persistence for the last 130,99 years. PANGAEA, <https://doi.org/10.1594/PANGAEA.897319>

Selected conference presentations (* indicates invited oral presentation)

- * Treat, C.C., M.C. Jones, L.S. Brosius, K.W. Anthony, S. Frolking. Methane Emissions from Northern Wetlands During the Holocene: A Synthesis Approach to Account for Wetland Expansion and Fen-Bog-Permafrost Transitions, AGU Fall Meeting, Online, 2021 (*invited*)
- Treat, C.C. , S. Frolking, J. Alder, M.C. Jones, A.B.K. Sannel, P. Camill. Vulnerability of Permafrost Carbon in Peatlands in Boreal and Arctic Canada. AGU Chapman Conference on Carbon-Climate Feedbacks, Aug. 2019, La Jolla, San Diego, U.S.A.
- Treat, C.C., M.E. Marushchak, C. Voigt, Y. Zhang, Z. Tan, Q. Zhuang, T.A. Virtanen, A. Räsänen, C. Biasi, G. Hugelius, D. Kaverin, P. A. Miller, M. Stendel, V. Romanovsky, F. Rivkin, P.J. Martikainen, N.J. Shurpali. Tundra landscape heterogeneity, not inter-annual variability, controls the decadal regional carbon balance in the Western Russian Arctic. Third ICOS Science Meeting, Sept. 2018, Prague, Czech Republic
- Treat, C.C., A.A. Bloom, M.E. Marushchak. Non-growing season methane emissions: An important component of annual budgets. Third ICOS Science Meeting, Sept. 2018, Prague, Czech Republic
- *Treat, C.C., A.A. Bloom, M.E. Marushchak. A synthesis of non-growing season and annual methane emissions among temperate, boreal, and arctic wetlands and uplands. American Geophysical Union Fall Meeting, December 2017, New Orleans, Louisiana (*invited oral presentation*)
- Treat, C.C., S. Frolking, M.C. Jones, J. Alder, N. Shurpali. Here Today, Gone Tomorrow? Using Contrasting Peatland Histories To Determine Fate Of Permafrost Carbon With Future Climate Change And Permafrost Thaw. Carbon Cycling in Boreal Peatlands and Climate Change II: Hyytiälä revisited, September 2017, Hyytiälä, Finland.
- Treat, C.C. A synthesis of growing-season and annual methane emissions among temperate, boreal, and arctic wetlands and uplands. European Geophysical Union Spring Meeting, April 2017, Vienna, Austria.
- Treat, C. C., N. Broothaerts, A. Dalton, R. Dommain, S. Finkelstein, G. Grosse, M. C. Jones, T. Kleinen¹, P. Kuhry, T. Lacourse, O. Lähteenoja, B. Notebaert, R. Payne, D. Peteet, A.B.K. Sannel, J. Stelling, J. Strauss, G. Swindles, J. Talbot, C. Tarnocai, G. Verstraeten, C. Williams, Z. Xia, Z. Yu, V. Brovkin. Buried Peats: Past Peatland Distribution as an Indicator of Hydroclimate and Temperature. AGU Fall Meeting, December 2016, San Francisco, CA.
- Treat, C.C., S. Frolking, M.C. Jones, J. Alder, 2015. Here Today, Gone Tomorrow? Using Contrasting Peatland Histories To Determine Fate Of Permafrost Carbon With Future Climate Change And Permafrost Thaw. AGU Fall Meeting, December 2015, San Francisco, CA.
- * Treat, C.C., E.S. Kane, J.W. Harden, C.D. Koven, 2015. Cryoturbation, Peat Accumulation, And Gleying: Do These Processes Affect Soil Carbon Distribution Within Permafrost Profiles? AGU Fall Meeting, December 2015, San Francisco, CA. (*invited oral presentation*)
- Treat, C.C., M.C. Jones, J. Loisel. 2014. Fen to bog to permafrost peatland transitions in high latitudes: Causes and effects of permafrost aggradation. AGU Fall Meeting, December 2014, San Francisco, CA.
- * Treat, C.C., S. Natali, C.M. Iversen, M. Lupascu, H. Santruckova. 2013. The fate of permafrost soil carbon under saturated conditions. AGU Fall Meeting, December 2013, San Francisco, CA. (*invited oral presentation*)
- Treat, C.C., M. Bhagat, J. Talbot, R. K. Varner, A.S. Grandy, S. Ewing, W.M. Wollheim, S. Frolking. 2012. Controls on soil carbon loss with permafrost thaw in Alaskan peatland ecosystems. Graduate Research Conference, University of New Hampshire, April 2013.

- Treat, C.C., M. Bhagat, J. Talbot, R. K. Varner, A.S. Grandy, S. Ewing, W.M. Wollheim, S. Frolking. 2012. Controls on soil carbon loss with permafrost thaw in Alaskan peatland ecosystems. AGU Fall Meeting, December 2012, San Francisco, CA.
- Treat, C.C., R.K. Varner, P. Crill. 2012. Long-term trends in soil respiration at a temperate fen. Mer Bleue Working Group Meeting, McGill University, Montreal, Quebec, Canada.
- Treat, C.C., D. Wisser, S. Marchenko, E. Humphreys, S. Frolking, K.F. Huemmrich. 2010. Predicting permafrost stability in northern peatlands with climate change and disturbance. AGU Fall Meeting, December 2010, San Francisco, CA.
- Treat, C., D. Wisser, S. Frolking, S. Marchenko. 2009. Stable, charred, or disappeared?: Peatland soil temperatures and permafrost sensitivity to interactions between temperature increases and changing disturbance regimes. American Geophysical Union Fall Meeting, San Francisco.
- Treat, C., D. Wisser, S. Frolking, S. Marchenko. 2009. Modeling permafrost degradation in peatlands. 2nd International Symposium: Peatlands in the Global Carbon Cycle, Prague.
- Treat, C.C., M.R. Turetsky, J.M. Waddington, J.W. Harden, A.D. McGuire. Methane emissions from boreal peatlands in a changing climate: Quantifying the sensitivity of methane fluxes to experimental manipulations of water table and soil temperature regimes in an Alaskan boreal fen. American Geophysical Union Fall Meeting, San Francisco, CA. December 2006.
- Treat, C., J. Bubier, R.K. Varner, P. Crill. Environmental and plant productivity controls on seasonal and interannual variation of CH₄ flux from a temperate peatland. American Geophysical Union Fall Meeting, San Francisco, CA. December 2005.
- Treat, C., J. Bubier, R.K. Varner, P. Crill. Interannual Variations in CO₂ and CH₄ flux from a temperate fen: 5 years of data. Ecological Society of America Annual Meeting, Montreal, Canada. August 2005.

Invited seminars

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| 02/2022 | Cold season carbon and nitrogen cycling in northern ecosystems. Max Planck Institute for Biogeochemistry, Jena, Germany |
| 04/2021 | Cold season biogeochemistry in northern ecosystems. Laboratory for Climate and Environmental Sciences (LSCE), France. |
| 04/2019 | Beyond the Permafrost Carbon Bomb: Insights and future directions for arctic and boreal wetland research. Department of Earth Sciences, University of Waterloo, ON, CA |
| 11/2018 | Re-imagining the disappeared: Reconstructing global peatland dynamics over the last 130,000 years from buried peat records. Department of Geography, Durham University, Durham, UK |
| 03/2018 | Beyond the Permafrost Carbon Bomb: Insights and future directions for arctic and boreal wetland research. Department of Earth Sciences, Vrije University, Amsterdam, The Netherlands |
| 12/2017 | The relative role of non-growing season methane fluxes in wetland and upland ecosystems across temperate, boreal and tundra biomes. Finnish Meteorological Institute, Helsinki, Finland |
| 11/2016 | Gone but not entirely forgotten: First assessment of global wetland distribution for the past 110,000 years. Max Planck Institute for Meteorology, Hamburg, Germany |
| 11/2016 | New, data-based reconstruction of peatland methane emissions during the Holocene. Alfred Wegner Institute for Polar Studies, Potsdam, Germany |
| 09/2016 | Effects of ecosystem succession and permafrost on wetland carbon dynamics. Department of Ecology and Evolution, University of Michigan, Ann Arbor, MI, USA |
| 10/2015 | Holocene carbon feedbacks from permafrost peatlands to climate. Carnegie Institute, Stanford University, Palo Alto, CA, USA |
| 10/2015 | Fens, bogs and polygons (oh my!): How do high-latitude wetlands change during the Holocene? Energy and Environmental Research Lab, Lawrence Berkeley National Lab, Berkeley, CA |
| 08/2015 | Past and future carbon feedbacks from permafrost peatlands to climate. U.S. Geological Survey, Reston, VA, USA |