Scott Zolkos

Woodwell Climate Research Center
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EDUCATION

Ph.D. Biological Sciences/Ecology, University of Alberta 2014-2019
Thesis: Fluvial inorganic carbon cycling across divergently evolving permafrost landscapes (Yukon and Northwest Territories, Canada)
Supervisor: Dr. Suzanne Tank
Activities: laboratory research and remote Arctic fieldwork (summers 2014-2017), teaching, coursework, leadership positions in University and international scientific groups, youth mentoring

B.A. Environmental Science/Geology, Middlebury College 2007-2011
Thesis: Geochemical and petrographic analysis of volcanic ejecta from the1790 explosive eruptions of Kīlauea, Hawai`i
Supervisors: Dr. Ray Coish (Middlebury), Dr. Donald A. Swanson (USGS Hawaiian Volcano Obs.)

PROFESSIONAL EXPERIENCE

Woodwell Climate Research Center (Falmouth, MA)
Research Scientist — Feb 2023–present

Harvard University (Cambridge, MA) **&**
Woodwell Climate Research Center (Falmouth, MA) — June 2020–Jan 2023
National Science Foundation Earth Sciences Postdoctoral Fellow
Supervisors: Dr. Elsie Sunderland, Dr. Sue Natali, Dr. Brendan Rogers

Woods Hole Research Center (Falmouth, MA)
Postdoctoral Researcher – Arctic. Supervisor: Dr. Sue Natali — Nov 2019–May 2020
Research Assistant. Supervisors: Dr. Scott Goetz, Dr. R. Max Holmes — Nov 2011–June 2014

Buzzards Bay Coalition (New Bedford, MA) — May–Sept 2011
Assistant Coordinator, Water Quality Monitoring Program

Vermont Geological Survey (Craftsbury, VT) — July–Aug 2010
Research Intern

RESEARCH INTERESTS

Global ecology and climate change, biogeochemistry, carbon and contaminant cycles, permafrost, land-freshwater-ocean linkages, climate and land use change, ecological conservation and management, Geographic Information Systems and remote sensing.

PUBLICATIONS AND REPORTS (AUTHORED & CO-AUTHORED, HYPERLINKED)

S. Zolkos et al. (*in preparation*): Soil mercury release from tundra wildfire in the Yukon–Kuskokwim Delta, Alaska.

S. Zolkos et al. (*in preparation*): Patterns and drivers of mercury cycling in wildfire-affected tundra lakes of the Yukon-Kuskokwim Delta, Alaska.

S. Zolkos et al. (*in preparation*): Mercury isotopes in permafrost cores from varied Alaskan ecosystems reveal patterns in mercury sources and cycling during the last 10,000 years.

J. Zhong et al. (*in preparation*): Drivers of fluvial carbon cycling revealed by spatio-temporal variability in major ions, $\delta^{34}S_{SO4}$, $\delta^{13}C_{DIC}$ and $\delta^{14}C_{DIC}$ in the upper Changjiang (Yangtze) River, China.

M. Thomas et al. (*under review*): Evidence for preservation of organic carbon interacting with iron in material displaced from retrogressive thaw slumps: case study in Peel Plateau, west Canadian Arctic.

J. Saros et al. (2022): Sentinel responses of Arctic freshwater systems to climate: linkages, evidence, and a roadmap for future research. *Arctic Science*.

S. Zolkos et al. (2022): Permafrost landscape history shapes regional patterns in fluvial chemistry, ecosystem carbon balance, and potential trajectories of change. *Global Biogeochemical Cycles*.

S. Zolkos et al. (2022): Physiographic Controls and Wildfire Effects on Aquatic Biogeochemistry in Tundra of the Yukon-Kuskokwim Delta, Alaska. *Journal of Geophysical Research–Biogeosciences*.

B.W. Abbott et al. (2022): We must stop fossil fuel emissions to protect permafrost ecosystems. *Frontiers in Environmental Science.*

S. Zolkos et al. (2022): Multi-decadal declines in particulate mercury and sediment export from Russian rivers in the pan-Arctic basin. *Proceedings of the National Academy of Sciences*.

S. Shakil et al. (2022): Low biodegradability of particulate organic carbon mobilized from thaw slumps on the Peel Plateau, NT, and possible chemosynthesis and sorption effects. *Biogeosciences*.

S.V. Kokelj et al. (2021): Thaw-driven mass-wasting couples slopes with downstream systems, and effects propagate through Arctic drainage networks. *The Cryosphere*.

L. Bröder et al. (2021): Preferential export of permafrost-derived organic matter as retrogressive thaw slumping intensifies. *Environmental Research Letters*.

K. Keskitalo et al. (2021): Downstream evolution of particulate organic matter composition from permafrost thaw slumps. *Frontiers in Earth Science–Biogeosciences*.

S. Zolkos et al. (2021): Detecting and mapping gas emission craters on the Yamal and Gydan Peninsulas, western Siberia. *Geosciences*.

E. Wologo et al. (2020): Stream dissolved organic matter in permafrost regions shows surprising compositional similarities but negative priming and nutrient effects. *Global Biogeochemical Cycles*.

S. Shakil et al. (2020): Particulate dominance of organic carbon mobilization from thaw slumps on the Peel Plateau, NT: Quantification and implications for stream systems and permafrost carbon release. (2020). *Environmental Research Letters*.

S. Zolkos et al. (2020): Thermokarst amplifies fluvial inorganic carbon cycling and export across watershed scales on the Peel Plateau, Canada. *Biogeosciences*.

S. Zolkos et al. (2020): Experimental evidence that permafrost thaw history and mineral composition shape abiotic carbon cycling in thermokarst-affected stream networks. *Frontiers in Earth Science – Geosciences*.

S. Zolkos et al. (2020): Mercury export from Arctic great rivers. *Environmental Science & Technology*.

S. Zolkos et al. (2019): Thermokarst effects on carbon dioxide and methane fluxes in streams on the Peel Plateau (NWT, Canada). *Journal of Geophysical Research- Biogeosciences*.

K.A. St. Pierre, **S. Zolkos,** S. Shakil et al. (2018): Unprecedented increases in total and methyl mercury concentrations downstream of permafrost thaw slumps in the western Canadian Arctic. *Environmental Science & Technology*.

S. Zolkos et al. (2018): Mineral weathering and the permafrost carbon-climate feedback. *Geophysical Research Letters*.

P. Jantz et al. (2016): Modeling Potential Impacts of Climate Change on Vegetation for National Parks in the Eastern United States. *Climate Change in Wildlands: Pioneering Approaches to Science and Management in the Rocky Mountains and Appalachians* (Ch. 8).

S. Zolkos et al. (2015): Projected tree species redistribution under climate change: Implications for ecosystem vulnerability across protected areas in the eastern United States. *Ecosystems*.

R. Coish et al. (2015): Geochemistry and origin of metamorphosed mafic rocks from the Lower Paleozoic Moretown and Cram Hill Formations of North-Central Vermont: Delamination magmatism in the western New England Appalachians. *American Journal of Science*.

S.J. Goetz et al. (2014): The relative importance of climate and vegetation properties on patterns of North American breeding bird species diversity. *Environmental Research Letters*.

S. Zolkos et al. (2013). A meta-analysis of terrestrial aboveground biomass estimation using lidar remote sensing. *Remote Sensing of Environment*.

D.A. Swanson et al. (2012): Ballistic blocks around Kīlauea Caldera: Their vent locations and number of eruptions in the late 18th century. *Journal of Volcanology and Geothermal Research*.

J. Kim et al. (2010): Bedrock Geologic Map of the Town of Craftsbury, Vermont. *Vermont Geological Survey Open File Report*.

OTHER SCIENTIFIC LEADERSHIP

International Arctic Science Committee
T-MOSAiC Executive Committee and Steering Group Member (2018-present)
Fellow, Terrestrial Working Group (2016-2018)

- Co-designing and implementing T-MOSAiC (link), an international, collaborative research program investigating the effects of Arctic climate change.

Association of Polar Early Career Scientists
Ex-Officio (2017-2019), Council Chair (2015-2016), Council Member (2014-2017)

- Promoted career development, education, and outreach for young polar scientists.
- Created the Arctic Snapshots program (link) to connect early-career researchers across the north.

University of Alberta Circumpolar Students' Association
Co-President (2015-2017), Executive Committee (2014-2017)

- Co-managed student group on northern research, led grant applications, awarded $2,400.
- Organized interdisciplinary University conference on northern earth, biological, and social science.

TEACHING AND MENTORING

National Science Foundation, The Polaris Project, Faculty (S2020)
Freshwater Ecology (BIOL 364): 4 x teaching assistant (T.A.) (University of Alberta, F2015-2018)
Landscape Ecology (BIOL 471/571): 1 x T.A. (U. Alberta, W2016)
Intro. to Biological Diversity (BIOL 108): 5 x T.A. (U. Alberta, F2014, W2015, W2017-2019)
University of Alberta U. School Mentoring (2015-2016): Inspired socially and economically vulnerable youth to pursue healthy lifestyles and a university education, and taught the benefits of teamwork.

PUBLIC ENGAGEMENT & SELECTED PUBLIC MEDIA COVERAGE

Arctic rhythms: stories of Northern culture, science, and change. *Presentation to Gosnold, MA town community* (planned for summer 2023).

Massive craters in Siberia are exploding into existence. What's causing them? *Discover Magazine*. January 27, 2021. (link)

Mercury Rising: The Implications of a Warming Arctic for a Toxin of Global Concern. *Invited Talk at Grant MacEwan University Department of Physical Sciences (Edmonton, Canada)*. February 12, 2019.

Mercury from thawing permafrost ending up in Arctic waterways, study finds. *Interview with Canadian Broadcasting Corporation (CBC)*. December 14, 2018. (link)

Permafrost thaw: more CO_2 than previously thought? *Interview with CBC, Radio Canada International*. September 20, 2018. (link)

Lake Abraham: an ethereal landscape of frozen bubbles. *Interview with British Broadcasting Corporation (BBC)*. February 19, 2018. (link)

AWARDS AND FELLOWSHIPS

2020 U.S. National Science Foundation Earth Sciences Postdoctoral Fellowship (3-year term)
2019 University of Alberta Faculty of Science Doctoral Dissertation Award
2018 University of Alberta Graduate Student Teaching Assistant Award
2016 International Arctic Science Committee (IASC) Fellow (2-year term)
2015 Aurora Research Institute Research Fellowship
2011 Middlebury College: B.A. Cum Laude, Departmental High Honors

RESEARCH FUNDING (TOTAL TO-DATE: ~$113K)

Funding granted competitively following a review process

U.S. National Science Foundation – Earth Sciences Postdoctoral Fellowship	$75,000
University of Alberta Community Reporting Award (2019)	$2,500
University of Alberta Ashley and Janet Cameron Travel Award (3x, 2016, 2018, 2019)	$2,750
University of Alberta Green & Gold Leadership and Professional Development Grant	$1,441
University of Alberta Northern Research Award (3x, 2015–2017)	$17,669

Arctic Institute of North America Grant-in-Aid Scholarship (3x, 2015–2017)	$3,000
University of Alberta Graduate Student Travel Award (2017)	$2,000
Colleges and Institutes Canada CleanTech Internship Program (co-applicant) (2016)	$12,000
Environment Canada Science Youth Horizons (co-applicant) (2015)	$12,000
Aurora Research Institute Research Fellowship (2015)	$3,000
Middlebury College John M. White ’52 Memorial Fund (2010)	$5,000

PROFESSIONAL AFFILIATIONS AND SERVICE

Memberships. American Geophysical Union (2009-present), Geological Society of America (2009-present), Association of Polar Early Career Scientists (2012-present), Permafrost Young Researchers Network (2015-present), International Arctic Science Committee (2016-present), Association for the Sciences of Limnology and Oceanography (2017-present)

Editor. *Arctic Science – T-MOSAiC Special Issue (Guest Associate Editor)*, *Environmental Pollution (Guest Associate Editor)*

Reviewer. ***Funding proposal (by organization):*** *National Science Foundation, National Aeronautics and Space Administration (review panel)*. ***Manuscript (by journal):*** *Science Advances, Environmental Science & Technology*, *Environmental Research Letters*, *Biogeosciences, Journal of Geophysical Research- Biogeosciences*, *Limnology and Oceanography, Science of the Total Environment, Water Resources Research*, *Global Ecology and Biogeography*, *Remote Sensing of Environment*, *Estuarine, Coastal and Shelf Science*. ***Reports:*** *IPCC Special Report on the Ocean and Cryosphere in a Changing Climate, IPCC AR6 WGII First Order Draft.*