

Kyle A. Arndt, PhD

Research Scientist II

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ABOUT

I am interested in understanding climate change impacts on trace gas exchange from natural and managed ecosystems. My primary experience focuses on trace gas fluxes from Arctic and high-latitude ecosystems. I am currently leading a build out a greenhouse gas monitoring network targeting the most underrepresented areas of the Arctic-boreal region. In my postdoc I used the process-based denitrification and decomposition (DNDC) model to understand carbon and nitrogen exchanges in agricultural ecosystems. My research there sought to build soil carbon while limiting greenhouse gas emissions from organic dairy systems. For my PhD dissertation, I researched non-growing season carbon flux dynamics at Arctic tundra sites on the Alaska North Slope working with eddy flux covariance, remote sensing, while providing support on eddy covariance projects in various ecosystems from mangroves and chaparral to coral reefs. I have worked on toxicology and environmental risk assessments of superfund sites from my time as an environmental consultant in the private sector and am interested in interdisciplinary work and outreach to remedy and understand global climate and pollutant issues.

EDUCATION

2020 Ph.D. Ecology

Joint doctoral program in ecology, UC Davis and SDSU

Dissertation: *Seasonal Impacts of Climate Change on the Carbon Balance of Alaskan Arctic Tundra Ecosystems*

2014 B.Sc. Environmental Science, *minor: Geospatial Technologies*

University of Vermont (UVM)

EXPERIENCE

Jan 2024 – present Research Scientist II, Woodwell Climate Research Center

Mar 2022 – Jan 2024 Research Scientist I, Woodwell Climate Research Center

Jan 2022 – May 2022 Adjunct Faculty, UNH

Sep 2020 – Mar 2022 Postdoctoral Research Associate, UNH

May 2020 – Sep 2020 Postdoctoral Research Fellow, SDSU

Apr 2016 – May 2020 Graduate Research Fellow, SDSU

Oct 2014 – Apr 2016 Ecologist, AECOM

Sept 2013 – Oct 2014 Research Technician, UVM LTER Arctic

PUBLICATIONS

h-index: 14, citations: 908 (Source: Google Scholar, Feb. 2025)

1. Vogt J., Pallandt M., Basso L., Bolek A., Ivanova K., Schlutow M., Celis G., Kuhn M., Mauritz M., Schuur E., **Arndt K.**, Virkkala A., Wargowsky I., Göckede M., *ARGO: ARctic greenhouse Gas Observation metadata version 1*. ESSD. 2025
2. Virkkala AM., Rogers B., Watts J., **Arndt K.**, Potter S., Wargowsky I., ... Natali S.M., *An increasing Arctic-Boreal CO₂ sink despite strong regional sources*. Nature Climate Change. **2025**

3. Hung J.K.Y., **Arndt K.**, Murphy P., Montemayor M., Rodenhizer H., Ludwig S., Rogers B.M., Natali S.M., *Slow post-fire carbon balance recovery despite increased net uptake rates in Alaskan tundra*. Environmental Research Letters. 2024
4. Watts J., Potter S., Rogers B., Virkkala A.M., Fiske G., **Arndt K.**, Burrell A., Butler K., Gerlt B., *Regional Hotspots of Change in Northern High Latitudes Informed by Observations from Space*. Geophysical Research Letters. **2024**
5. Pallandt M., Jung M., **Arndt K.**, Natali S., Rogers B., Virkkala A., Göckede M., *High-latitude eddy covariance temporal network design and optimization*. JGR Biogeosciences. **2024**
6. Contosta A.R., **Arndt K.**, Baulch H.M., Casson N.J., Harpold A., Morelli T.L., Sirén A.P. K., Templer P.H., *Threshold Changes in Winter Temperature and Precipitation Drive Threshold Responses Across Nine Global Climate Zones and Associated Biomes*. Annual Review of Ecology, Evolution, and Systematics. **2024**
7. Hashemi J., Lipson D.A., **Arndt K.**, Davidson S.J., Kalhori A., Lunneberg K., Delden L., Oechel W.C., Zona D. *Thermokarst landscape exhibits large nitrous oxide emissions in Alaska's coastal polygonal tundra*. Communications Earth & Environment. **2024**
8. Wang Y., He L., Liu J., **Arndt K.**, Rodrigues J., Zona D., Lipson D., Oechel W., Ricciuto D., Wullschlegel S., Xu X., *Intensified Positive Arctic–Methane Feedback under IPCC Climate Scenarios in the 21st Century*. Ecosystem Health and Sustainability. **2024**
9. **Arndt K.**, Hashemi J., Natali S., Schiferl L., Virkkala A., *Recent advances and challenges in monitoring and modeling non-growing season carbon dioxide fluxes from the Arctic boreal zone*. Current Climate Change Reports. **2023**
10. **Arndt K.**, Reyes Gomez D., Quigley C., Brito A., Price N., Contosta A. *Seaweed supplementation to organic dairy cows may reduce climate impact of manure in pasture soils during a laboratory incubation*. Journal of Sustainable Agriculture and Environment. 2023
11. Watts J., Farina M., Kimball J., Schiferl L., Liu Z., **Arndt K.**, Zona D., Ballantyne A., Euskirchen S.E., Parmentier F.J., Helbig M., Sonnentag O., Tagesson T., *Carbon Uptake in Eurasian Boreal Forests Dominates the High Latitude Net Ecosystem Carbon Budget*. Global Change Biology. **2022**
12. Schiferl L.D., Watts J.D., Larson E.J.L., **Arndt K.**, Biraud S.C., Euskirchen E.S., Henderson J.M., McKain K., Mountain M.E., Munger J.W., Oechel W.C., Sweeney C., Yi Y., Zona D., and Commane R., *Using atmospheric observations to quantify annual biogenic carbon dioxide fluxes on the Alaska North Slope*. Biogeosciences. **2022**
13. Zona D., Lafleur P.M., Hufkens K., Gioli B., Bailey B., Burba G., Euskirchen E.S., Watts J.D., **Arndt K.**, Farina M., Kimball J. S., Heimann M., Göckede M., Pallandt M., Christensen T.R., Mastepanov M., López-Blanco E., Dolman A.J., Commane R. ... Oechel, W.C., *Pan-Arctic soil moisture control on tundra carbon sequestration and plant productivity*. Global Change Biology, **2022**
14. Plein J., Clark R., **Arndt K.**, Oechel W., Stow D., Zona D., *Response of vegetation and carbon fluxes to brown lemming herbivory in Northern Alaska*. Biogeosciences. **2022**
15. Malone S., Oh Y., **Arndt K.**, Burba G., Commane R., Contosta A., Goodrich J., Loescher H., Starr G., Varner R., *Gaps in Network Infrastructure limit our understanding of biogenic methane emissions in the United States*. Biogeosciences. **2022**
16. Wang Y., Yuan F., **Arndt K.**, Liu J., He L., Zuo Y., Zona D., Lipson D., Oechel W., Ricciuto D., Wullschlegel S., Thornton P., Xu X., *Upscaling Methane Flux From Plot Level*

to Eddy Covariance Tower Domains in Five Alaskan Tundra Ecosystems. *Frontiers in Environmental Science*. **2022**

17. Zona D., Lafleur P., Hufkens K., Bailey B., Gioli B., Burba G., Goodrich J., Liljedahl A., Euskirchen E., Watts J., Farina M., Kimball J., Heimann M., Goeckede M., Pallandt M., Christensen T., Mastepanov M., López-Blanco E., Jackowicz-Korczynski M., Dolman A.J., Marchesini L.B., Commane R., Wofsy S., Miller C., Lipson D., Hashemi J., **Arndt K.**, Kutzbach L., Holl D., Boike J., Wille C., Sachs T., Kalhori A., Song X., Xu X., Humphreys E., Koven C., Sonnentag O., Meyer G., Gosselin G., Marsh P., Oechel W., *Earlier snowmelt may lead to late season declines in plant productivity and carbon sequestration in Arctic tundra ecosystems*. *Scientific Reports*. **2022**
18. **Arndt K.**, Campbell E., Dorich C., Grandy A. S., Griffin T., Ingraham P., Perry A., Varner R., Contosta A., *Initial soil conditions outweigh management in a cool-season dairy farm's carbon sequestration potential*. *Science of the Total Environment*. **2022**
19. Watts J., Natali S., Minions C., Risk D., **Arndt K.**, Zona D., Euskirchen E.S., Rocha A., Sonnentag O., Helbig M., Kalhori A., Oechel W., Ikawa H., Ueyama M., Hidekin K., Celis G., Schuur T., Humphreys E., Kim Y., Lee B.Y., Goetz S., Madani N., Schiferl L., Commane R., Kimball J., Liu Z., Torn M., Potter S., Wang J., Jingfeng X., Xing L., *Soil Respiration Strongly Offsets Carbon Uptake in Alaska and Northwest Canada*. *Environmental Research Letters*. **2021**
20. Contosta A., **Arndt K.**, Campbell E., Grandy S., and Varner R., *Management intensive grazing on New England dairy farms enhances soil nitrogen stocks and elevates soil nitrous oxide emissions without increasing soil carbon*. *Agriculture Ecosystems and Environment*. **2021**
21. Hashemi J., Zona D., **Arndt K.**, Kalhori A., and Oechel W., *Seasonality buffers carbon budget variability across heterogeneous landscapes in Alaskan Arctic Tundra Ecosystems*. *Environmental Research Letters*. **2021**
22. Wilkman W., Zona D., **Arndt K.**, Gioli B., Nakamoto K., Lipson D., and Oechel W., *Ecosystem scale implication of soil CO₂ concentration dynamics during soil freezing in Alaskan Arctic tundra ecosystems*. *Journal of Geophysical Research: Biogeosciences*. **2021**
23. **Arndt K.**, Lipson D., Hashemi J., Oechel W., Zona D., *Snow melt stimulates ecosystem respiration in Arctic Ecosystems*. *Global Change Biology*. **2020**
24. **Arndt K.**, Santos M., Ustin S., Davidson S., Stow D., Oechel W., Tran T., Graybill B., and Zona D., *Arctic Greening Associated with Lengthening Growing Seasons in Northern Alaska*. *Environmental Research Letters*. **2019**
25. Natali S., Watts J., Rogers B., Potter S., Ludwig S., Selbmann A., Sullivan P., Abbott B., **Arndt K.**, Birch L., Björkman M., Bloom A., Celis G., Christensen T., Casper T., Christiansen C., Commane R., Cooper E., Crill P., Czimczik C., Davydov S., Du J., Egan J., Elberling B., Euskirchen E., Friborg T., Genet H., Goeckede M., Goodrich J., Grogan P., Helbig M., Jafarov E., Jastrow J., Kalhori A., Kim Y., Kimball J., Kutzbach L., Lara M., Larsen K., Lee B., Liu Z., Loranty M., Lund M., Lupascu M., Madani N., Malhotra A., Matamala R., McFarland J., McGuire A. D., Michelsen A., Minions C., Oechel W. C., Olefeldt D., Parmentier F., Pirk N., Poulter B., Quinton W., Rezanezhad F., Risk D., Sachs T., Schaefer K., Schmidt N., Schuur E., Semenchuk P., Shaver G., Sonnentag O., Starr G., Treat C., Waldrop M., Wang Y., Welker J., Wille C., Xu X., Zhang Z., Zhuang Q., Zona D., *Large loss of CO₂ in winter observed across the northern permafrost region*. *Nature Climate Change*. **2019**

26. **Arndt K.**, Oechel W., Goodrich J., Kalhori A., Hashemi J., Sweeney C., and Zona D., *Sensitivity of methane emissions to later soil freezing in Arctic tundra ecosystems*. Journal of Geophysical Research: Biogeosciences. **2019**
27. Parker S., Bowden W., Flinn M., Giles C., **Arndt K.**, Beneš J., Jent D., *Effect of particle size and heterogeneity on sediment biofilm metabolism and nutrient uptake scaled using two approaches*. Ecosphere. **2018**
28. Parazoo N., Arneth A., Pugh T., Smith B., Steiner N., Luus K., Commene R., Benmergui J., Stofferahn E., Liu J., Rödenbeck C., Kawa R., Euskirchen E., Zona D., **Arndt K.**, Oechel W., Miller C., *Spring photosynthetic onset and net CO₂ uptake in northern terrestrial ecosystems triggered by landscape thawing*. Global Change Biology. **2018**

SUBMITTED PUBLICATIONS IN REVIEW

1. Kuhn M., Olefeldt D., **Arndt K.**, Bastviken D., Bruhwiler L., Crill P., DelSontro T., Fluet-Chouinard E., Grosse G., Hovemyr M., Hugelius G., MacIntyre S., Malhotra A., McGuire D., Oh Y., Poulter B., Treat C., Turetsky M., Varner R., Anthony K.W., Watts J.D., Zhang Z., *Boreal-Arctic methane emission estimates lowered by distinguishing wetland and lake classes but highlight climate sensitivities*. Nature Climate Change
 2. Ying Q., Poulter B., Watts J.D., **Arndt K.**, Virkkala A.M., Bruhwiler L., Oh Y., Rogers B.M., Natali S.M., Sullivan H., Schiferl L.D., Elder C.D., Peltola O., Bartsch A., Armstrong A., Desai A.R., Euskirchen E., Göckede M., Lehner B., Nilsson M.B., Peichl M., Sonnentag O., Tuittila E.S., Sachs T., Kalhori A., Ueyama M., and Zhang Z., *WetCH4: A Machine Learning-based Upscaling of Methane Fluxes of Northern Wetlands during 2016–2022*. Earth System Science Data
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PRESENTATIONS (first author only)

- NOAA GML Seminar Series, *Closing the gap on arctic-boreal carbon fluxes*, 2025
- Northwest Territories Landscape Carbon Workshop, *Wildfires, Carbon, and Monitoring*, 2025
- AGU Fall Meeting: *Improvements to the Arctic Boreal Carbon Flux Network and Remaining Gaps*, 2024
- AGU Fall Meeting: *Ongoing Improvements to the Arctic-Boreal Eddy Covariance Tower Network*, 2023
- Invited Talk: World Meteorological Organization (WMO) United Nations (UN), Global Greenhouse Gas Watch (G3W), Geneva, CH: *An Improved Carbon Flux Monitoring Network and Flux Upscaling in the Arctic-Boreal Zone and Gap analysis for the terrestrial biosphere observations*, 2023
- Facilitated Workshop: Observation Infrastructure for Natural Methane Emissions, Yale University, New Haven CT: *Gaps in Network Infrastructure*, 2023
- EGU General Assembly, Vienna AT: *Strategic expansion of the Arctic-Boreal carbon flux network*, 2023
- World Meteorological Organization (WMO) United Nations (UN), Greenhouse Gas Monitoring Symposium, Geneva, CH: *Strategic expansion of the Arctic-Boreal carbon flux network*, 2023
- AGU Fall Meeting, B15E-02: *Strategic expansion of the Arctic-Boreal carbon flux network*, 2022
- AGU Fall Meeting, GC45R-02: *Initial Soil Conditions Outweigh Management in a Cool-Season Dairy Farm's Carbon Sequestration Potential*, 2021

Invited Talk, Bates College: *Effects of seaweed feed amendments on manures and ecosystem biogeochemistry*, 2021

UNH Postdoctoral Appreciation Week, *Seasonally variable shifts in the carbon balance of Alaskan Arctic tundra ecosystems*, Durham NH, Speed Talk, 2020

UNH Department of Earth Sciences Seminar Series, *Seasonally variable shifts in the carbon balance of Alaskan Arctic tundra ecosystems*, Durham NH, Seminar, 2020

NASA ABoVE Science Team Meeting, *1-41: High resolution changes in surface water and vegetation near Utqiagvik, AK*, San Diego, CA, Poster, 2019

EGU General Assembly, *EGU2019-115: Increased methane emissions due to later soil freezing in Arctic tundra ecosystems*, Vienna AT, Poster, 2019

NASA ABoVE Science Team Meeting, *75: Increased methane loss due to later soil freezing in the Arctic may explain renewed atmospheric methane growth*, Seattle WA, Poster, 2018

ILEAPS, *0125: Methane emissions dominate warming potential of Alaskan Arctic tundra*, Oxford UK, Poster, 2017

AGU Fall meeting, *163451: Carbon Flux Throughout Arctic Tundra Soils and Snowpack*, San Francisco CA, Oral, 2016

SERVICE ACTIVITIES

Co-Lead Permafrost Community of Practice: Interagency Arctic Research Policy Committee (IARPC)

Hosted “Towards an integrated Arctic greenhouse gas monitoring program” workshop in collaboration with the Arctic Monitoring and Assessment Programme (AMAP)

Hosted “Observation Infrastructure for Natural Methane Emissions” Workshop at Yale University 2023

AGU Outstanding Student Presentation Award Judge, AGU 2024 Fall Meeting

AGU Outstanding Student Presentation Award Judge, AGU 2023 Fall Meeting

AGU Outstanding Student Presentation Award Judge, AGU 2022 Fall Meeting

AGU June 2021 Webinar Series Host: Career Panel in the Biogeosciences: Beyond Academia

AGU June 2021 Webinar Series Host: Techniques in Effective Data Visualization

AGU Biogeosciences: Early Career Committee, 2020 - 2023

AGU Biogeosciences: Diversity, Equity, and Inclusion Committee, 2020- 2023

NASA ABoVE Spectral working group

NASA ABoVE Carbon working group

PolarTREC teacher host 2018

Reviews for: Science of the Total Environment, Arctic Monitoring and Assessment Programme, Ecological Applications, Global Change Biology, Environmental Research Letters, Ecology, Journal of Geophysical Research: Biogeosciences, Agricultural and Forest Meteorology, Environmental Science & Technology, Biogeosciences

TEACHING

Spring 2022 Global Environmental Change, UNH

Fall 2021 Invited Lectures: Safety, equity, and inclusion in geosciences field work, UNH

Fall 2021 Invited Lecture: Climate and Climate Change, The Physical Science Basis, UNH

Spring 2021 Invited Lecture: Biogeochemistry, Nitrogen Cycle, UNH

Fall 2020 Invited Lectures: Safety, equity, and inclusion in geosciences field work, UNH
Fall 2019 BIOL 354: Experimental Ecology, SDSU
Fall 2014 NR280: Stream Ecology, UVM (TA)

AWARDS

2024 Quantifying Large Greenhouse Gas (GHG) Emissions from a Retrogressive Thaw Slump in Alaska: Fund for Climate Solutions (FCS) Woodwell Climate (Co-I)
2023 NSF RAPID: Immediate Post-Fire Carbon Balance of Boreal Peat-Wetland Mosaics (PI)
2021 USDA Organic Agriculture Research and Extension Initiative (OREI) (postdoc)
2021 Iola Hubbard Endowment, UNH (PI)
2021 NASA-EPSCoR R&TI (postdoc)
2021 USDA Sustainable Agricultural Systems (SAS) (postdoc)
2019 Early career scientist travel fund European Geosciences Union
2018 Student travel award NASA ABoVE 2018 meeting
2017 University Graduate Fellowship, SDSU
2017 University Graduate Fellowship “Top-Off” Award, SDSU