CV

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Google Scholar
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I'm a Postdoctoral Researcher working at the Woods Hole Research Center. My expertise is in Arctic carbon cycling, ecology, and statistical upscaling. I enjoy my work as a researcher and hope to continue working with Arctic biogeochemistry and global change topics in the future.

EDUCATION

2016-2020 **University of Helsinki, Doctor of Science (Geography, Doctoral Programme in Geosciences)**
PhD thesis: Arctic Ecosystems: New Insights into Knowledge Gaps and Carbon Cycling (Accepted).
I studied the environmental coverage of field sampling locations across the Arctic as well as the current state of knowledge and drivers of tundra CO_2 fluxes using literature reviews and an observational field study.
Supervisors: Professors M. Luoto, A. Lehtonen & J. Rinne

2017 **Lund University, PhD exchange**

2013-2016 **University of Helsinki, Master of Science (Physical Geography)**
Major: physical geography (5/5), minors: geoinformatics & remote sensing (4/5)
Master's thesis: Topsoil geochemistry and its controlling factors in a changing tundra environment (03/2016, Eximia cum laude approbatur, second best grade)
Supervisor: Professor M. Luoto

2010-2013 **University of Helsinki, Bachelor of Science (Geography)**
Major: physical geography (4/5), minors: biology (4/5), geology (4/5)
Bachelor's thesis: The role of soil quality, topography and geomorphology for arctic-alpine vegetation (5/5, best grade).

2013 **Hamburg University, BSc exchange**

RESEARCH POSITIONS

04/2020- **Woods Hole Research Center, Postdoctoral Researcher**
I utilize synthesized CO_2 flux measurements, remote sensing data, and statistical models to study the drivers and spatiotemporal patterns in CO_2 fluxes across the boreal and tundra biomes. The project also aims to understand decadal changes in Arctic surface conditions well as map fire emissions.
Supervisors: Assistant scientists Dr. B. M. Rogers & Dr. J. D. Watts

2016 **University of Helsinki, Grant Researcher**
Planning, organizing, and leading field data collection in Kilpisjärvi, northern Finland.

2016-2017 **New digital Atlas of Finland -project, Project Coordinator**
Applying grants for a science popularization project.

2015 **Finnish Environment Institute, Intern**
Preprocessing, vegetation index calculations and time series analysis of Landsat 8 data.

2014-2016 **University of Helsinki, Research Assistant**
Collecting vegetation, biomass, and soil data and measuring CO_2 fluxes during the summer in Kilpisjärvi, northern Finland and Rastigaisa, northern Norway.

2013-2014 **Finnish Natural History Museum, Guide**

TEACHING EXPERIENCE

2014-2019 **University of Helsinki, teacher at 7 different field, practical, and lecture courses in geography:**

2017-2019 Spatial terrestrial research. MSc level. Co-creating the course. Teaching about flux measurements, vegetation and soil sampling, and helping students to finalize their presentations. Field and practical course.

2017	Biogeochemical cycles in physical geography. MSc level. Created and developed the course, responsible for the entire course with guest lecturers. Teaching in lectures and practicals about global carbon cycle.
2015-2016	Field course in geography. BSc level. Teaching about microclimate, geomorphology and soil science in the field and practicals.
2015-2016	Methods in geography and regional geography. BSc level. Teaching about geomorphological interpretation and map-making in practicals.
2015	Current topics in geographical research. BSc level. Created and developed the course, teaching by guest lecturers.
2015	Data acquisition, analysis and cartography. BSc level. Teaching about spatial data sets, coordinate systems, and basics of remote sensing and map-making in lectures and practicals.
2014-2016	Practical course in geography and regional geography. BSc level. Teaching about geology, Environmental Impact Assessments and academic writing in lectures and practicals. In 2016, I was a team leader in a group work where students developed environmental solutions for Helsinki. Students won a price from the city of Helsinki.

SUPERVISION OF THESES

2019-	**Co-supervisor of Elisa, H.** MSc: Dynamics of local-scale CO_2 exchange in the Arctic
2019-	**Co-supervisor of Helena, R.** MSc: Spatial drivers of local-scale CO_2 exchange in the Arctic
2020	**Co-supervisor of Outi, S.** MSc: Spatial and temporal drivers of soil respiration in the tundra
2019	**Co-supervisor of Nina, S.** MSc: Soil carbon stocks in a subarctic tundra environment
2017	**Co-supervisor of Outi, S.** BSc: Soil respiration in the tundra environment
2017	**Co-supervisor of Tiia, M.** BSc: Methane exchange of permafrost soils

POSITION OF RESPONSIBILITY

2018-2019	**Terrestrial Working Group Fellow in International Arctic Science Committee (IASC)** 5 early career researchers selected out of 115 international applicants

REFEREED JOURNALS

Journal for Agricultural and Meteorological Forestry, Global Ecology and Biogeography, Journal of Geophysical Research

SKILLS AND EXPERIENCE

Data analysis	Proficient R user with expertise in working with large data sets and conducting different statistical analyses. I have worked with both traditional linear regression and machine learning methods, and hierarchical modeling (e.g. structural equation modeling). I have experience on upscaling fluxes and soil properties at local, landscape, and pan-Arctic scales and at different temporal resolutions.
Field work	I have completed four field seasons in northern Finland and Norway. I have experience in coordinating research expeditions and collecting data on greenhouse gas fluxes (manual chamber and soil profile methods), plant species (species identification), plant functional composition (traits, biomass), soils (soil sampling, soil depth, soil colour, soil texture), soil decomposition (litter bags), and soil microclimate measurements.
Remote sensing and GIS	I have processed high- and low-resolution optical and topographical remote sensing data (e.g. Landsat, Sentinel-2, MODIS, GIMMS, GMTED2010). I have worked with spatial data in different formats (vectors and rasters) in R, ArcMap, SAGA-GIS, and QGIS. I can automate different spatial processes.
Laboratory work	I have spent ~6 months in the laboratory conducting soil pH, CNS, and nutrient analyses. I have experience on aboveground plant trait measurements in the laboratory.

LANGUAGE SKILLS

Finnish - native
English - excellent written and oral knowledge
German - excellent written and oral knowledge, lived and studied in Germany
Swedish - good written and oral knowledge, lived in Sweden

AWARDS & GRANTS

2019 University of Helsinki (conference trips, 3000 €)
2018 Jenny and Antti Wihuri Foundation (PhD project, 24 000 €)
2018 Väisälä fund (PhD project, 25 000 €)
2018 Societas pro Fauna et Flora Fennica (field work, 2000 €)
2018 Otto Malm foundation (conference trips and field work, 6000 €)
2017 Suomen Kulttuurirahasto (PhD project, 12 000 €)
2017 ERASMUS grant for exchange (1000 €)
2017 University of Helsinki (grant to develop a new MSc level course, 2000 €)
2016 Alfred Kordelinin säätiö (PhD project, 12 000 €)
2016 Nordenskiöld foundation (PhD project, 8600 €)
2016 Societas pro Fauna et Flora Fennica (field work, 1200 €)
2016 Otto Malm foundation (field work, 3000 €)
2016 Honorary award (1500 €) in Clean Vallisaari innovation competition as a teacher of the awarded group
2015 University of Helsinki (1000 €, a grant to develop a new BSc level course)
2015 Societas pro Fauna et Flora Fennica (field work, 800 €)
2015 Maa- ja vesitekniikan tuki (field work and Master's thesis, 1200 €)
2015 University of Helsinki (Master's studies, 2000 €)
2013 University of Helsinki (Grant for excellent study success)
2013 ERASMUS grant for exchange (1000 €)

PUBLICATIONS

Virkkala, A.-M. et al. (2019). Identifying multidisciplinary research gaps across Arctic terrestrial gradients. Environmental Research Letters.

Happonen, K. et al. (2019). Snow is an important control of plant community functional composition. Oecologia.

Virkkala, A.-M. et al. (2018). The current state of CO_2 flux chamber studies in the Arctic tundra: a review. Progress in Physical Geography: Earth and the Environment.

Bjorkman, A. D. et al. (2018). Tundra Trait Team: A database of plant traits spanning the tundra biome. Global Ecology and Biogeography.

PUBLICATIONS IN REVIEW

Happonen, K., Virkkala, A.-M. et al. (shared first authorship). Plant community functional composition and diversity drive tundra carbon cycling. Preprint. In review at Functional Ecology.

Thomas, H. et al. (2019). Litter quality and climate drive tundra litter decomposition. In review at Nature Communications.

Kemppinen, J. et al. Mediating effect of dwarf shrubs on tundra soils. Preprint. In review at Ecosystems.

PUBLICATIONS UNDER PREPARATION, SUBMITTED IN 2020

Virkkala, A.-M. et al. Upscaling terrestrial ecosystem CO_2 fluxes across the high-latitude region.

Virkkala, A.-M. et al. Revealing the spatial heterogeneity of Arctic terrestrial CO_2, CH_4 and N_2O fluxes.

KEY DATA PUBLICATIONS

Happonen, K., Virkkala, A.-M. et al. (2020). Data and code for "Plant community functional composition and diversity drive fine-scale variability in carbon cycling in the tundra". Zenodo.

Virkkala, A.-M. et al. (2019). Multidisciplinary representativeness maps across the Arctic. Figshare.

Virkkala, A.-M. & M. Luoto (2018). Arctic Chamber Metadata. Arctic Data Center.

ORAL PRESENTATIONS

Virkkala, A.-M. (2019). An update on high-latitude CO_2 flux synthesis and upscaling. A presentation at the Permafrost Carbon Network Meeting in San Francisco.

Virkkala, A.-M. (2019). High-latitude terrestrial regions remain a CO_2 sink over 1990-2015. A presentation at the AGU Fall Meeting in San Francisco.

Virkkala, A.-M. (2019). Identifying multidisciplinary research gaps in Botany across Arctic terrestrial gradients. A presentation at Arctic Vegetation Archive workshop in Arkanghelsk, Russia.

Virkkala, A.-M. (2019). A lecture for German and Finnish high-school students about global carbon cycle at the Department of Geosciences and Geography. Organized by Geopiste.

Virkkala, A.-M. (2018). The need for high-resolution GIS and remote sensing data sets: lessons learned from circumpolar CO_2 flux synthesis. A presentation at UArctic Congress in Helsinki, Finland.

Virkkala, A.-M. (2018). The potential of Sentinel-2 to predict CO_2 fluxes in the Arctic. A presentation at UArctic Congress in Helsinki, Finland.

Virkkala, A.-M. (2018). Synthesizing Arctic terrestrial environmental research. A presentation at National Center for Ecological Analysis and Synthesis (NCEAS) in Santa Barbara, USA.

Virkkala, A.-M. (2018). Mapping Arctic CO_2 flux hot spots. A 60-minute lecture about my research at a seminar with ~30 listeners at the Center for Ecosystem Science and Society (Ecoss) at North Arizona University.

Virkkala, A.-M. (2018). The spatial variation of high-latitude CO_2 fluxes: a synthesis. A presentation via Skype for Arctic CO_2 flux synthesis workshop in Santa Barbara, USA. Workshop supported by Arctic Data Center and NCEAS.

Virkkala, A.-M. (2018). The spatial variation of high-latitude CO_2 fluxes: a synthesis. A presentation for Spring Symposium organized by Doctoral Programme in Wildlife Biology Research in University of Helsinki, Finland.

Virkkala, A.-M. (2017). Local CO_2 fluxes in the tundra: from review to future publications. A presentation for the 3rd National Finnish Colloquium of Geosciences in Espoo, Finland.

Virkkala, A.-M. (2017). Open GIS data sets for carbon cycle studies. Examples from a review, meta-analysis and field studies. A presentation for the National Geoinformatics Days in Helsinki, Finland.

Virkkala, A.-M. (2017). The current state of local CO_2 flux studies in the tundra: a review. A presentation for Arctic Science Summit in Prague, Czech Republic.

POSTER PRESENTATIONS

Virkkala, A.-M. et al. (2020). Climatic coverage of arctic-boreal CO_2 flux sites: considerations for upscaling. A poster for the 6th ABoVE Science Team Meeting.

Virkkala, A.-M. et al. (2019). The potential of Sentinel-2 to predict CO_2 fluxes in the Arctic. A poster for Arctic Science Summit Week in Arkhangelsk, Russia.

Virkkala, A.-M. et al. (2019). Upscaling terrestrial CO_2 fluxes across high-latitude regions with statistical modeling. A poster for EGU General Assembly in Wien, Austria.

Virkkala, A.-M. et al. (2018). Large spatial variability in CO_2 balance across the circumpolar region 1990-2015. A poster for EUROFLUX-workshop in Hyytiälä, Finland.

Virkkala, A.-M. et al. (2018). The spatial variation of high-latitude CO_2 fluxes: a synthesis. A poster for ARKTIKO-seminar organized by the Academy of Finland in Lammi, Finland

Virkkala, A.-M. et al. (2017). Local CO_2 flux studies in the tundra: a review. A poster for the Arctic Flux workshop in Hyytiälä, Finland.

Virkkala, A.-M. (2017). Carbon cycling in a changing tundra environment: from local to circumpolar scale. A poster for European Space Agency's Advanced Remote Sensing –course in Gödöllö, Hungary.

TEACHING MATERIAL

Helsingin yliopiston maantieteen osaston opetusmonisteita 47 (2018). Maantieteen kenttäkurssi. Teaching material for a BSc-level field course in geography. Olli Ruth & Anna-Maria Virkkala (ed.) 154 p.

SCIENTIFIC OUTREACH

Virkkala, A.-M. et al. (2020). A new study finds research gaps in environmental science disciplines across the Arctic. A press release about our new article. Link.

Parmentier, F.-J. et al. (2019). Is the northern permafrost zone a source or a sink of carbon? Link.

Virkkala, A.-M. (2019). Understanding and Synthesizing Arctic terrestrial landscapes. Link.