



Holger Pagel

Postdoctoral researcher

Biogeophysics

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Research statement

The response of soil systems to environmental and climate change emerges from complex biochemical and physical interactions and feedbacks. My research seeks to unravel the complexity of regulation mechanisms of biogeochemical cycling in soil. This calls for an integrative research strategy that systematically combines mathematical modelling with experimental approaches and effective data analysis.

In my research, process-based models are developed and applied as powerful quantitative tools for studying how physical and biogeochemical interactions control soil functions. Modelling is informed by experimental data including information on the structure of soil microbial communities and their functions that are obtained using advanced stable isotope and molecular biology methods.

Current position

University of Hohenheim
Institute of Soil Science
and Land Evaluation

Postdoctoral Researcher

since 2021 – PRESENT

TraiMErgy | Integrated Trait-Based Modeling of Carbon and Energy Flows in Soil Systems

TraiMErgy aims at the complex interplay between the soil microbiome and the carbon and energy flows in soil. Our central hypothesis is that the functional complexity of the soil microbiome and SOM controls matter and energy flows in soil systems. This hypothesis is tested using a novel, complex, data-driven bioenergetic SoilSystems Model: SoSyM-C. SoSyM-C will integrate biogeochemical, thermodynamic, multi-omics, and isotopic data. The outcome of TraiMErgy will be a deeper understanding of soil organic matter turnover, coded in a mechanistic, robust and predictive biogeochemical-bioenergetic model.

Bibliometrics

Google Scholar
(June 2022)

Peer reviewed publication

22

h-index

11

Total number of citations

310

Academic career and work experience

University of Hohenheim

Institute of Soil Science
and Land Evaluation

Postdoctoral Researcher and Lecturer (75% due to childcare)
2020 - 2021

Head of Young Investigator Group (75% due to childcare)
2015 - 2019

SoilReg | Microbial Regulation of Soil Functions in Agro-Ecosystems

The goal of SoilReg's research was to elucidate the small-scale regulation of soil functions by microorganisms and its relevance for matter cycling. We developed and applied process-based biogeochemical models in combination with experimental work to understand how microbial traits and spatial heterogeneity of soils regulate carbon cycling and pesticide turnover.

PhD in Agricultural Sciences - summa cum laude
(5 month parental leave: 07-08/ 2009, 02/ 2010, 04/ 2011, 05/ 2012)
2008 - 2015

The Detritosphere as Biogeochemical Interface for Bacterial and Fungal Degradation of MCPA and Phenanthrene

Mentors: Profs. Thilo Streck and Ellen Kandeler

Identifying regulation mechanisms of accelerated degradation of organic chemicals in soil

- Development of the process-based C turnover model PECCAD
- Performance and evaluation of complex laboratory experiments using isotopically labelled compounds (¹³C, ¹⁴C)

Technische Universität
Berlin

Institute of Ecology

Diploma in Environmental Technology
1998 - 2007

Sandy soils as source of colloidal phosphorus in leachates of agricultural soils (Thesis)

Mentor: Prof. Martin Kaupenjohann

Evaluating drivers of colloid-facilitated phosphorus transport using experiments with undisturbed soil columns

- Development of an extraction method for measuring colloidal phosphorus
- Comprehensive analysis of colloids and phosphorus in soil solutions

Self-employee
2007

DFG Graduate Research Programme "Perspectives on Urban Ecology II"

Support with soil column experiments on transport and sorption of the herbicide glyphosate in urban soils

Student assistant

2005 - 2006

DFG project „Mobilization and Mobility of colloidal phosphorus in sandy soils“

Experimental support and analysis of colloids and phosphorus including data evaluation

Russian academy of sciences - Novosibirsk

Trainee

2007 (2 months)

Institute of Agrochemistry and Soil Science

Support in soil mapping and organisation of a soil ecological excursion

Teaching

Environmental Modelling (Computer exercises)

2015 - 2022 (2 SWS), University of Hohenheim

Modeling of Microbial Activity and Bioreactive Transport

2016 & 2019, Fall schools RTG 1829

Bodenkundliche Geländeübungen

2008 - 2012, University of Hohenheim

Current research

LOWPESTS | Low-cost observations for water-air-soil of pesticides in Ethiopian soils using time-integrated samplers

2021-2022

with Dr. Alexander Haluska (University of Tübingen)

Fast-start funding for joint projects on topics related to Africa by the Universities of Hohenheim and Tübingen

TraiMErgy | Integrated Trait-Based Modeling of Carbon and Energy Flows in Soil Systems

2021-2024

DFG (subproject of PP 2322 SoilSystems)

BabbA | Biologisch abbaubare Beutel in der Bioabfallverwertung: Potential zur Verdrängung konventioneller Plastikbeutel, Abbau in der Anlage, Umweltrelevanz - TP 2: Abbauverhalten im Boden

2021-2022

BWPLUS, Ministerium für Umwelt, Klima und Energiewirtschaft Baden-Württemberg

CROP | Combining ROot contrasted Phenotypes for more resilient agro-ecosystem

2020-2024 (Phase I) – 031B0909B

BMBF | Rhizo4Bio

RTG 1829 “Integrated Hydrosystem Modelling”

since 2018 (third cohort)