

Master thesis (m/f/d)

Texture dependency of carbon decomposition, based on laboratory and modelling approaches.

The thesis is embedded in the framework of the citizen science project “Expedition Erdreich” and its use of the “Tea Bag Index”. With this index, the decomposition of tea bags in soils is recorded on a global scale. The goal of the Tea Bag Index is to determine the decomposition rates in different soils and geographical regions and thus to gain a better understanding of the global carbon cycle.

The Master thesis will focus on the texture dependency of carbon decomposition under laboratory conditions. Therefore, two types of tea bags (green tea with a fast decay rate and rooibos tea with a slow decay rate) will be embedded in incubation vessels. These vessels will contain soil from different sites with varying soil textures (sandy, loamy and clayey soil). Over the incubation time the tea will be decomposed by microorganism and the produced CO₂ will continuously be measured. Since both the amount of C added and the CO₂ release are known, the decomposition dynamics can be modelled. For this purpose, an established approach using different C-models (CCB, ICBM, C-TOOL...) will be used for evaluation. Statistical analyses will also be used to determine the texture dependence of the C mineralization, and the knowledge gained will be used to evaluate texture functions of different C models.

Specific Tasks:

- Conduction of incubation experiments
- Management and evaluation of the data
- Applying carbon models to the incubation data
- Statistical analyses
- Literature research on texture dependency of mineralisation processes

Qualification profile:

- Study of environmental, geo or soil science
- Experience with laboratory workflow and data management
- Ideally programming experience in „R“
- Language: German or English

Our Offer:

- Excellent Supervision
- Introduction to carbon models and their application
- Contact to Master students working on related projects (Tea Bag Index) to guarantee an exchange and to work out synergies between the projects
- The possibility to publish your results

Earliest Start:

- June 2021

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Further literature and links:

www.expedition-erdreich.de; www.teatime4science.org; <https://www.ufz.de/index.php?de=46026>
www.sciencedirect.com/science/article/abs/pii/S0167880998001066