TECHNISCHE UNIVERSITÄT DRESDEN

Fakultät Umweltwissenschaften, Fachrichtung Forstwissenschaften

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Topic for MSs Thesis

The role of adsorption processes to mineral surfaces in preservation of organic matter in soils

Decomposition of organic carbon (OC) in soils is inhibited by different stabilisation processes. A widely accepted process is the preservation of OC through the formation of strong associations between OM and diverse reactive mineral surfaces called organo-mineral associations. The stabilisation of OM against biological attack by the mineral surfaces is a function of the chemical nature of the soil mineral fraction and the presence of mineral surfaces capable of adsorbing organic materials. However, the relationship between adsorption of organic compounds to reactive fine-sized mineral surfaces and the stabilisation against microbial degradation is still under discussion.
A difficulty in studying the complex OM dynamics in organo-mineral associations of soils is that analysis of total OC does not provide detailed information on OM dynamics. The use of stable isotopic labelled substances give the opportunity to trace the pathways of OM in different forms and pools. Accordingly, isotopic labelled substances can be used for differentiating complex process of OC dynamics and stabilisation of OC in fine-sized organo-mineral fractions.
We plan adsorption and desorption experiments with labelled model substances on fine-sized (< 20 µm) soil fractions, as well as incubation experiments. In these MSc thesis we will offer innovative fundamental research about the role of adsorption and desorption on the preservation of OM in fine-sized organo-mineral fractions in soils. We are looking for a motivated student interested to work with advances analytical methodologies in the lab.

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