



MSc/BSc Project in Geomicrobiology

The research group for [Geomicrobiology](#) at the Center for Applied Geosciences at the University of Tübingen is looking for a MSc/BSc student who will work on:

Sequestration of particulate organic carbon via association with iron (Fe) phases

Terrestrial systems such as soils and permafrost are major pools in the global carbon cycle, storing ~4000 Pg carbon (1 Pg = 10^{15} g). Understanding the bioavailability of organic carbon in these systems is critical to the prediction of carbon dynamics and possible release of greenhouse gases. The association of organic carbon (as part of organic matter) with iron (Fe) bearing minerals has been observed to protect carbon from microbial respiration. Field studies have estimated that up to 20% of subsurface organic carbon may be associated with Fe phases. While interactions between Fe and *dissolved* organic matter (DOM) have been studied extensively, Fe – *particulate* organic matter (POM) interfacial processes are largely unknown. Given that the majority of organic carbon is in particulate form which often has chemical groups different from those in DOM, a fundamental laboratory-based understanding of the associations between POM and Fe is necessary. This knowledge will lead to better interpretation of mixed Fe-C particulate phases in environmental systems, and their susceptibility to microbial degradation.

This project aims to investigate the reactions between the reduced (Fe^{2+}) and oxidized (Fe^{3+}) forms of iron with particulate organic matter (POM) under varying oxic and anoxic conditions. The formation pathways of Fe-POM phases will be determined using wet geochemical and characterization techniques. The bioavailability of these phases will be tested in microbial incubations set up under different redox conditions representative of subsurface environments.

Whom are we looking for? We are looking for a highly motivated BSc/MSc student with a background in (bio)geochemistry and mineralogy who is interested in carbon cycling, electron transfer processes, mineral transformations, and geochemical/microbiological techniques. The student should be willing to learn new methods and able to work in a team. We expect that the student to be highly motivated and interesting in pursuing interdisciplinary research towards fundamental insights into environmental systems.

What are we offering? A project in an international and multidisciplinary group with great opportunities to learn geomicrobiological (e.g. microcosms) and mineralogical (e.g. Mössbauer spectroscopy) techniques and be acquainted with research from molecular to field scales.

If you are interested, please contact:

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