A key focus of the BGI department is the development of large scale terrestrial biosphere models (TBM) for a better understanding of biosphere-climate feedbacks, with particular emphasis on interactions between carbon, nutrient and water cycles. A highly important question in this context is the stability of soil organic matter under changing environmental conditions. However, soil processes, their parameterization and soil interactions with vegetation growth are still a major uncertainty in TBMs. Two active areas of research in our department are the effect of altered rhizosphere inputs on the microbial activity and thereby the organic carbon storage, as well as the control that of soil temperature and moisture have on the decomposition process. Our aim is to achieve a better representation of these nutrient and moisture effects on soil carbon storage and turnover in our soil model “COMISSION” (Ahrens et al. 2015), which is linked to the Earth system Model of the Max-Planck-Society.

In this context, we are offering

**a PhD position on “Modelling soil organic matter dynamics”**

which may focus on one of the following two topics

**Project #1: soil moisture effects**

- Modelling the effect of soil moisture on relevant processes (e.g. decomposition, adsorption, transport, root processes), within the COMISSION model
- Modelling the effect of soil organic matter on soil hydrology
- Applying the model to better understand soil organic matter along a gradient from well drained to poorly drained soils and analyse the emergent dynamics of soil organic matter and water-cycle

**Project #2: soil nutrient cycles**

- Contributing to the further development of the nutrient cycle representation (carbon or nutrient limitation of microbial biomass, microbial carbon- and nutrient-use efficiency, stoichiometric constraints on decomposition), within the COMISSION model
- Investigating the effect of increased plant-based rhizosphere inputs under higher levels of atmospheric CO₂ on soil organic matter decomposition and nutrient release.
- Evaluating the novel model using data from Free Air CO₂ Enrichment experiments.

Both projects include

- Designing and performing global modelling experiments
- Publishing in international scientific journals and presenting on national and international scientific and project meetings
Your profile

- Scientific degree (M.Sc or equivalent) in a quantitative natural science (e.g. geo-ecology, environmental science, physics, quantitative biology, or applied mathematics)
- Interest in soil organic matter dynamics and global biogeochemical cycles,
- Very good programming skills or the ability and willingness to learn this quickly
- Good communication and organizational skills
- Good knowledge of English

**Research Environment:** The successful applicants will join a creative, international team – led by Marion Schrumpf, Markus Reichstein, and Sönke Zaehle – in a vibrant research environment, encompassing experimental and theoretical work on the role of the biogeochemical cycles of carbon, nutrients and water in the Earth system. The department has established an extensive network of international collaborations in Europe, the U.S. and Australia. Jena is not only famous for its high-tech industry, internationally renowned research institutions and a modern university, but also for its beautiful natural setting in the Saale valley with its steep limestone slopes. The climate is mild, and a large variety of plants grow in the close surroundings, including wine grapes and wild orchids. The city of Jena has a large active student scene supporting a diverse cultural life.

**The conditions of employment,** including upgrades and duration follow the rules of the Max Planck Society for the Advancement of Sciences and those of the German civil service (TVöD-Bund). Funding will be for 3 years with a salary equivalent to TVöD E13/57% (Collective Wage Agreement for the Civil Service – Bund). The Max-Planck Society is committed to increasing the number of individuals with disabilities in its workforce and therefore encourages applications from such qualified individuals. Furthermore, the Max Planck Society seeks to increase the number of women in those areas where they are underrepresented and therefore explicitly encourages women to apply.

**Application:** Please send your application including a letter of interest, CV, and the names and contact information of two references, and any inquiries to szaehle@bgc-jena.mpg.de, with “PhD SOM” in the subject line.