URPP Global Change Biodiversity

The University of Zurich (UZH) Research Priority Programme (URPP) on Global Change and Biodiversity (GCB) is an established interdisciplinary research program (http://www.gcb.uzh.ch). Biodiversity is both a response variable affected by global change drivers (land use change, climate change, invasions, exploitation, and pollution) and a factor modifying ecosystem processes and services that are essential to human well-being. An improved capability to predict the consequences of changes in drivers will aid improved prediction of the state of the environment. The URPP GCB implements innovative avenues in this research domain by using a latitudinal gradient approach based on interactions, feedback and scale, to provide a more reliable and robust knowledge of global change processes.

We are looking for highly motivated, enthusiastic and independent applicants with a passion for science to join our research program. A high standard of written and spoken English is required. We offer outstanding working conditions, a high quality of life in Zurich, and an excellent support environment. The position start is as soon as a suitable candidate is found. Salaries correspond to the UZH regulations of PhD salaries. We invite applications for the following PhD positions:

Ref DEEP C - MS-17-01 PhD students Soil Biogeochemistry
„DEEP C - Deep soil carbon cycling in a warming world – the molecular perspective“

We invite applications for two PhD projects in our group working on "Terrestrial carbon cycle and global change". We seek to understand the influence of anthropogenic environmental change, such as increasing temperature on the terrestrial carbon cycle including turnover of soil organic matter.

Understanding soil organic matter dynamics is critical to understand agricultural, and forestry environments, and their role in the global carbon cycle. Along with global change, temperatures will increase. The warming of planet Earth will be accelerated if soil organic matter is lost to the atmosphere as greenhouse gas.

Representations of this positive carbon-cycle-climate feedback are part of many climate projections, but there is little experimental evidence for several reasons: i) Research has focused on rapid processes (measuring respiration, and quantifying mass loss on decomposition), and not on the analytically more challenging, insights into the physico-chemical properties of soil organic matter that influences the rates of these processes, especially over longer-term. ii) Analytical efforts have focused on bulk measurement, and only recently on functionally different organic matter pools (density, and size fractions) or sources (plant vs. microbial). iii) Experimental efforts have favored laboratory incubations (often using disturbed soil), with relatively short time scales (weeks to months) over long-term (years and longer) *in situ* field experiments. iv) The first generation of field experiments mostly used surface warming, which did not warm the subsoil, thus missing a large part of the total SOM (Schmidt, Torn et al. 2011, Nature 478, 49-56; Torn et al. 2015, Soil 1, 575-582).

The project takes advantage of already functional multi-year deep soil warming field experiments (e.g. Hick Pries et al. 2017, Science 355, 1420-1423). These sites represent three biomes: Mediterranean grassland, Temperate forest, and Boreal forested peat. We will use the rapidly evolving methodological development of isotopic labeling and molecular markers (Jansen & Wiesenberg, 2017, Soil Discussions) to “look inside the soil to resolve such dynamics as root-microbial-mineral interactions” (Bradford et. al. 2016, Nat. Clim. Chang. 6, 751-758). For the first time, we will combine multi-year, deep soil warming, molecular markers and isotopic labeling in functionally different SOC pools, to explore how the soil-plant system responds to a +4°C warmer world. We will find out if allocation between above and belowground plant biomass will change. And if deeper in the soil profile, new mineral sorption sites will be filled, potentially stabilizing SOC for longer. Will warming favor bacteria over fungi and consequently the build-up of bacterial necromass deeper in the profile? Ultimately, we want to integrate our results into the next generation of vertically-resolved SOC models as tools for understanding and predicting soil biogeochemical response to global change. This project on belowground carbon cycling is aimed to answer and provide insights into the fundamental question: What will the role of soils be in terrestrial feedbacks to warming over the next 100–300 years?

The ideal candidate will be experienced in experimental work, interested in operating high- end equipment in the lab, able to analyze comprehensive datasets, and will be a good team player. Responsibilities include supervision of students, presentations of results at conferences and publication in international refereed journals. Requirements include a MSc-degree in soil biogeochemistry or a related discipline, such as physical geography, geoecology, environmental sciences, food chemistry, and work experience in analytical methods. Good knowledge of English as working language is essential. A driving license is beneficial. Start upon mutual agreement. More information on our research group can be found at www.geo.uzh.ch/phys. For further details contact Prof. Dr. Michael W. I. Schmidt (michael.schmidt@geo.uzh.ch).

Send a letter of application, CV, a statement of your motivation and your research interests and addresses of two potential referees (e.g. former advisers) to Prof. Dr. Michael W. I. Schmidt, University of Zurich, Dept. of Geography, Winterthurerstr. 190, 8057 Zürich, Switzerland as single pdf file. Evaluation will start in May 2017 and will continue until positions are filled.