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Changes in vascular plant functional types drive carbon cycling in peatlands

Lilli Zeh (1), Luca Bragazza (2,3,4), Björn Erhagen (5), Juul Limpens (6), and Karsten Kalbitz (1)

(1) Institute for Soil Science and Site Ecology, Technical University of Dresden, Tharandt, Germany (lilli.zeh@tu-dresden.de), (2) Department of Life Science and Biotechnologies, University of Ferrara, Ferrara, Italy (luca.bragazza@unife.it), (3) Swiss Federal Institute for Forest, Snow and Landscape Research (WSL), Lausanne, Switzerland, (4) Ecological Systems Laboratory, Ecole Polytechnique Fédérale de Lausanne, Lausanne, Switzerland, (5) Department of Ecology and Environmental Science, Umeå University, Umeå, Sweden (bjorn.erhagen@umu.se), (6) Plant Ecology and Nature Conservation, Wageningen University and Research Center, Wageningen, Netherlands (juul.limpens@wur.nl)

Northern peatlands store a large organic carbon (C) pool that is highly exposed to future environmental changes with consequent risk of releasing enormous amounts of C. Biotic changes in plant community structure and species abundance might have an even stronger impact on soil organic C dynamics in peatlands than the direct effects of abiotic changes. Therefore, a sound understanding of the impact of vegetation dynamics on C cycling will help to better predict the response of peatlands to environmental changes. Here, we aimed to assess the role of plant functional types (PFTs) in affecting peat decomposition in relation to climate warming.

To this aim, we selected two peatlands at different altitude (i.e. 1300 and 1700 m asl) on the south-eastern Alps of Italy. The two sites represent a contrast in temperature, overall vascular plant biomass and relative ericoids abundance, with the highest biomass and ericoids occurrence at the low latitude. Within the sites we selected 20 plots of similar microtopographical position and general vegetation type (hummocks). All plots contained both graminoids and ericoids and had a 100% cover of *Sphagnum* mosses. The plots were subjected to four treatments (control, and three clipping treatments) in which we selectively removed aboveground biomass of ericoids, graminoids or both to explore the contribution of the different PFTs for soil respiration (n=5) and peat chemistry. Peat chemical composition was determined by the analysis of C and N and their stable isotopes in association with pyrolysis GC/MS. Soil respiration was measured after clipping with a Licor system. Preliminary findings suggest that peat decomposition pathway and rate depend on plant species composition and particularly on differences in root activity between PFTs. Finally, this study underlines the importance of biotic drivers to predict the effects of future environmental changes on peatland C cycling.