EGU21-2803
https://doi.org/10.5194/egusphere-egu21-2803
EGU General Assembly 2021


# Modulators of soil organic carbon (SOC) stocks and dynamics in an intensively used hummocky landscape in North-East Germany

**Lena Katharina Öttl**[1], Florian Wilken[1,2], Michael Sommer[3,4], and Peter Fiener[1]

[1]Institut für Geographie, Universität Augsburg, Augsburg, Germany (lena.oettl@geo.uni-augsburg.de)
[2]Department of Environmental Systems Science, ETH Zürich, Zürich, Switzerland
[3]Leibniz Center for Agricultural Landscape Research ZALF e.V., Müncheberg, Germany
[4]Institut für Umweltwissenschaften und Geographie - Geoökologie, Universität Potsdam, Potsdam, Germany

The young moraine landscape of North-East Germany is highly prone to tillage-dominated soil erosion processes due to highly mechanised farming in a rolling topography. The corresponding soil redistribution pattern highly influences crop biomass production and soil organic carbon (SOC) dynamics. The aims of the study are to understand the effect of soil redistribution processes on SOC dynamics like dynamic replacement and efficient SOC burial. Therefore, an updated version of the spatially explicit soil redistribution and carbon turnover model SPEROS-C was applied for a large-scale (200 km²) simulation of lateral soil and SOC redistribution and vertical SOC turnover (spatial and vertical resolution 5 m x 5 m and 1 m soil depth, respectively). A sensitivity analysis was applied to identify the dominant modulators of SOC in the modelling approach (carbon input by roots, manure, and residues, decomposition of SOC, etc.). Uncertainties in model structure, process parameterisation, and input data are analysed with the GLUE approach (Generalized Likelihood Uncertainty Estimation). This approach is also used to estimate regional model parameters (e.g. SOC turnover rates, crop-specific root length density distribution, C input by aboveground biomass, manure, residues, etc.) to allow landscape-scale estimations of soil redistribution and accompanied C balance and hence, if this leads to a sink or source of $CO_2$.