



Soil organic matter stocks in Bavaria as driven by land use, soil type, topography and climate change

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Climate change will have profound impacts on organic matter stocks and thus on the functionality of soils. The predicted rising temperatures in Bavaria might lead to an increased decomposition and release of soil carbon into the atmosphere, which would deteriorate a number of important soil functions. Information about the effect of rising temperatures on soils is however scarce.

In this study, a comprehensive data set of 1459 soil profiles completely sampled down to the parent material or at least to a depth of 1 m was used to predict SOC stocks for the state of Bavaria separately for top- and subsoils. As potential predictor parameters for SOC storage, we used pedogenetic, topographic and environmental parameters for different random forest models. Our objectives were to identify main drivers of SOC storage in top- and subsoils and to predict the current total SOC storage of Bavaria.

In order to identify how organic carbon stocks in soils has already changed over the last 30 years, we used soil data from about 120 long term observation sites with constant management practices. The long term observation sites are homogeneously distributed over Bavaria and comprise forest, grassland and agricultural systems. These sites have been established in the middle of the 80's and have been re-sampled approximately every 10 years. This data set gives us the unique possibility to investigate the effect of rising temperatures on the organic matter storage of soils under different land uses.