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Soil organic matter status in forest soils – possible indicators for climate change induced site shifts

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The quantity and quality of soil organic matter (SOM) and SOM pools and thus the soil properties related to carbon sequestration and water retention are not constant but exhibit considerable variation through changing climate. In total changes in soil fertility and an increase in plant stress are expected. This is relevant for northwest Europe as well and may have economic and social impacts since functions of forests for wood production, groundwater recharge, soil protection and recreation might be affected.
The study is done by comparative investigation of selected sites at four watersheds that represent typical forest stands in the region of Luxembourg and South West Germany. The aim is to identify SOM storage and stability in forest soils and its dependence on site properties and interaction with tree stand conditions.
According to state of the art fractionation schemes functional C pools in forest soils and their stabilization mechanisms are investigated. In particular, distribution patterns are determined depending on location, tree stand and climatic conditions. Aim is to identify characteristics of SOM stability through fractionation of SOM according to density, particle size and chemical extractability and their subsequent analytical characterization. So far, reasons about the origin, composition and stabilization mechanisms underlying the different SOM pools are not fully understood.
Presented are different patterns of distribution of SOM in relation to land use and site conditions, as well as similarities and differences between the different forest soils and results in addition to passive OM pool, which is mainly responsible for long-term stabilization of carbon in soils.
These are aligned with selected general' soil properties such as pH, CEC and texture.