



Organic matter composition of peat soils affected by genesis and drainage conditions

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The organic matter (OM) of peat soils often dominates the overall soil properties because of the low mineral contents. The quantity and quality of OM depends on the environmental conditions during peat genesis. We hypothesize that the OM quality in terms of the composition of OM functional groups can help to better understand the processes of peat soil development. The objective was to analyze OM composition of peat soils as a function of genesis, water regime, and land use. Three plant samples and 29 peat samples were taken from 7 sites (located northern Germany) which are different in peat genesis and land use intensity. The samples were analyzed with Fourier Transform infrared (FTIR) spectroscopy. The lower contents in CH functional groups for the fen samples as compared to bog samples reflect a higher biochemical activity in the fen as compared to the ombotrophic bog environments. The role of the peat genesis for OM composition could be confirmed by FTIR data of a Canadian ombrotrophic bog. The relative higher CH content in samples from non-drained as compared to those from drained fens could be explained by selective preservation due to anaerobic conditions. Increasing drainage intensity seems to cause a relative decrease in CH content and an increase in C=O content of the peat samples, reflecting an enhanced aerobic decomposition. The results suggest that peat genesis and drainage affects both OM content and composition substantially. However, the greater variability in OM composition as compared to that of bog samples indicate that SOM in peat soils is not only influenced by climate, land use or drainage but it is also affected by the type of land use at sites in the close neighborhood.