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Changing mineral phase associated organic matter due to 150 years cultivation of a forest soil

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Soil organic matter (SOM) is a key component that determines most properties of the soil. SOM is responsible for soil structure, porosity, fertility, cation exchange capacity, hydrological properties and puffer capacity. SOM is a heterogeneous mixture of organism derived molecules with various size and composition. Actual environmental circumstances affect SOM composition directly (flora, decomposition dynamics, tillage) and indirectly (climate, mineral composition of the soil, hydrological properties), however each clue of former environmental impacts is stored as well. Various SOM components are presumed to be located by different forces on different mineralogical particles. Present study aims to compare SOM quantity and composition of the same topsoil under different land uses. Soil under continuous forest is compared to the arable field where forest clearance was done 150 years before. Soil organic carbon (SOC) content of the arable soil decreased to 50% due to land use change, though aggregate stability did not change substantially. Under both land uses $\sim$ 80% of the bulk samples were found in aggregated form, while SOM within the aggregates was less polymerized under arable crops. On the other hand SOC content of the particulate organic matter fraction under arable crops increased. Based on the dynamic light scattering (DLS) results each individual SOM fraction has a polydispers distribution, that indicates the presence of the whole molecular size palette in each sample. Nevertheless some specific molecular size values such as 460 nm in case of arable land and 5500 nm in case of forest seemed to be predominant. DLS results were hardly comparable to those gained using photometric indexes because of the ambiguities. For more precise findings static light scattering method for molecular weight distribution is planned. G. Jakab was supported by the János Bolyai scholarship of the HAS, which is kindly acknowledged here.