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Characterization of soil organic matter composition in of top and sub soil samples from colluvial and eroded sites

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During erosion, soil particles (i.e. clay sized particles) can be transported along hillslopes from hilltop to foot slope forming the colluvic soil at topographic depressions. The objective was to compare soil organic matter (SOM) content and composition and SOM fractions from eroded with those of soils from colluvic and unaffected sites. Soil samples were from different relief positions along a hillslope including Haplic Regosol (HR), Colluvic Regolsol (CR), Haplic Luvisol (HL), and eroded Luvisol (eL). Also the run-off fractions from two erosion experiments were analyzed. A sequential extraction procedure was adapted to separate particles (POM) from water (OM(W)) and pyrophosphate soluble organic matter (OM(PY)) fractions. Soil samples and fractions were analyzed with Fourier transform infrared (FTIR) spectroscopy. The content of soil organic carbon (SOC) in the colluvic soil (CR) was 2-times higher as in the eroded soil (HR). The OM(W) fraction represented about 5 % of SOC while OM(PY) was up to 80% except for the HR samples. The FTIR spectra of all soil samples were very similar except for HR, where the absorption band at 1450cm-1 due indicated the presence of carbonate. Despite the similarity, the FTIR spectra indicated differences in the content of carboxyl (C=O) and alkyl (CH) groups: highest intensities of C=O absorption band was in the spectra from HR samples for water and pyrophosphate soluble OM fractions. This higher C=O group content suggested a potentially higher cation exchange capacity of the SOM. However, the FTIR spectra indicated a lower wettability for the HR soil. For the runoff samples, the SOM composition changed with rainfall duration. The results suggest that erosion changes not only the content but also the composition of SOM.