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Correlation between soil organic carbon variation and land use changes in Neamţu catchment

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The vertical distribution of organic carbon in soil (SOC), considered to be a key component of the carbon cycle in the soil and difficult to delimit in mountain ecosystems. The purpose of this research was to determine the sequestration of organic carbon in the soil according to three types of land use in the Neamtu catchment. Being situated in the Carpathian and sub-Carpathian zone, approximately 77% of the Neamţu river basin territory is wooded with mixed forests. Furthermore, there are significant areas occupied by pastures, meadows and bushes. The most common changes of intended land use were: from forest to grassland, from forest to arable, from forest to urban use, from grassland to arable, from grassland to urban use, and less, from grassland to forest or from arable to grassland. In case of deforestation or fire, the SOC is reduced by an amount equivalent to biomass missing. As a result of the insect attack, the living biomass turns into deadwood and the total organic carbon will persist for a while even after decomposition of the wood, which will be incorporated into the forest soil. Litter and soil organic carbon last longer after fire or deforestation, but in time it is eroded either reshuffled or mineralized. Based on complexity of SOM due to heterogeneous mixture of functional groups, distinctly FTIR working procedures and data interpretation are demand to establish the fingerprint of SOM composition. The spectrum obtained is the product of the vibrations of the bonds within a molecule that are produced after passing an IR beam through a sample and collecting the resulting wavelength information.
There were four intensive field campaigns of different types of use, summing up 80 sampling points at two depths (0-15cm, 15-30cm). Estimate of sequestration and carbon stock storage is achieved with greater accuracy at local scale. Spectral characterisation of soil samples was performed using a Bruker Vertex 70 equipment, while the carbon content was determined by combustion at 1000oC with Analytik Jena multi N/C 2100 with HT 1300 solid module and other general analyses. Different absorption bands were noticed along the frequency range 600-2500 cm-1 being directly related to the type of functional groups and chemical bonds from the substrate, while are influenced by the specific site conditions (layer thickness, soil type, texture, forest type, vegetation composition) and aliphatic dominating band The rate of carbon recovery depends on the type of substrate, organic compounds, volatile salts, water content, inorganic carbon and crop management.