



CO₂ emission from soils impacted by erosion and deposition processes

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The aim of this work was to describe an impact of erosion and deposition processes on soil properties and consequently on a microbial activity and CO₂ emission. Study was performed on morphologically diverse study site in loess region of Southern Moravia, Czech Republic. The original soil type is Haplic Chernozem, which was due to erosion changed into Regosol (steep parts) and Colluvial soil (base slope and the tributary valley). The grab soil samples were taken from topsoil at 5 positions of the selected elevation transect and also from the parent material (loess). The basic soil properties were measured in the laboratory: bulk density, pH_{KCl}, pH_{H₂O}, oxidizable organic carbon content, CaCO₃ content and salinity. CFU (Colony-forming units) were analyzed to describe microbial activity. The net CO₂ exchange rate soil (NCER) was measured in the laboratory on the undisturbed soil samples using LCi-SD portable photosynthesis system with Soil Respiration Chamber.

In general, the microbial activity and CO₂ emission increased with increasing organic matter content. The largest values were measured on topsoil at the upper part of the transect, which was only slightly impacted by erosion. The lowest values were obtained on topsoil at the steepest and heavily eroded parts of the transect and on the parent material. Results showed close correlation between the microbial activity (CFU) and all soil properties and less close correlation between the maximum value of NCER and soil properties. The positive correlation was found between CFU and the oxidizable carbon content $R^2=0.92$ or salinity $R^2=0.81$. The negative correlation was found between CFU and pH_{KCl} ($R^2=0.94$), pH_{H₂O} ($R^2=0.90$), CaCO₃ ($R^2=0.78$) or bulk density ($R^2=0.81$). The positive correlation was found between NCER and the oxidizable carbon content $R^2=0.63$ or salinity $R^2=0.43$. The negative correlation was found between NCER and pH_{KCl} ($R^2=0.66$), pH_{H₂O} ($R^2=0.55$), CaCO₃ ($R^2=0.45$) or bulk density ($R^2=0.77$). Finally the positive correlation was also revealed between CFU and the maximum value of NCER ($R^2=0.68$).

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