



## **Application of VNIR diffuse reflectance spectroscopy for mapping of organic matter redistribution due to erosion and deposition processes**

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Visible and near-infrared (VNIR) diffuse reflectance spectroscopy is cost- and time-effective and environmentally friendly techniques method used for prediction of soil properties. Study was performed on the soils from the agricultural land from the municipalities of Brumovice (209 samples), Sedlcany (67 samples), Vidim (74 samples) and Zelezna (32 samples). In Brumovice original soil type was Haplic Chernozem on loess, which was due to erosion changed into Regosol (steep parts) and Colluvial soil (base slope and the tributary valley). A similar process has been described at other three locations Sedlcany, Vidim and Zelezna where the original soil types were Haplic Cambisol on gneiss, Haplic Luvisol on loess and Haplic Cambisol on shales, respectively.

The goal of the study was to evaluate relationship between soil spectra curves and organic matter content to provide an efficient tool for mapping of organic matter redistribution (i.e. soil degradation) due to erosion and deposition processes. Samples were taken from the topsoil within regular grid covering studied areas. The soil spectra curves (of air dry soil and sieved using 0.2 mm sieve) were measured in the laboratory using spectrometer FieldSpec®3 (350 – 2 500 nm). Partial least squares regression (PLSR) was used for modeling of the relationship between spectra and measured organic matter content. Prediction ability was evaluated using the  $R^2$ , root mean square error (RMSE).

The results showed the best prediction of the organic matter content was obtained for soil samples from Brumovice ( $R^2 = 0.78$ , RMSE = 0.15) and decreased as follows: Zelezna ( $R^2 = 0.68$ , RMSE = 0.23), Sedlcany ( $R^2 = 0.64$ , RMSE = 0.18) and Vidim ( $R^2 = 0.61$ , RMSE = 0.12). In general, the results confirmed that the measurement of soil spectral characteristics is a promising technology for a digital soil mapping and predicting studied soil properties.

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