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Investigation of spectral properties of different Quaternary paleosols and parent materials

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Diffuse Reflectance Spectroscopy (DRS) is a rapid method for analysing sediments and paleosols, which is a relatively new approach in Quaternary research. This method take into account the clay mineral content, the amount of Fe-bearing minerals and the grain size composition of samples at the same time.

Continuing our earlier research (Szeberényi et al. 2019), this paper reveals the relationship between the DRS curves of paleosols and their parent material. The basis of recent research was the most variable curve sections (between 400-1460 nm wavelength range) of entire measurement range (between 240-2000 nm). The goal of the actual study was to quantify the significant differences between original reflectance curves of paleosols and their parent materials in the case of different quaternary sediment successsions.

Different Quaternary sediment samples were chosen for characterization and comparison their reflectance curves, hereby detection and quantify the most important spectral properties of different paleosols and parent materials. Samples of different sediment types and paleosol variants were investigated from a loess-paleosol sequence at Malá nad Hronom (Slovakia) and a fluvial-aeolian sediment complex at Pilismarót (Hungary).

Five investigated curve sections were separated as the best indicators of reflectance properties of DRS curves. To compaire of spectral properties of samples was used the length of investigated curve sections. It could be explain by ΔR% value, which was shown the difference of reflectance intensity between end points of investigated curve sections.

This investigation showed the quantifiable differences between the units of pleistocene sediment successions, based on the reflectance properties. The influence of pedogenic processes were good detectable. Significant discrepancies were observed between reflectance curves of well-developed paleosols and parent material samples in the VIS-NIR range. Only in the visible range were observed differences between the weak developed paleosol layers and their parent materials. It could be separated from each other the fine sand, the sandy silt and the loess materials based on

the intensity of entire reflectance curves.