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Identification of archaeological features through spectroscopic analysis.

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Reflectance spectra of archaeological soils in the visible and near IR spectral range can be identified among natural soil spectra though an analysis method using PCA (principal component analysis). Applying this method, buried kitchen remains in Italy showed clear differences compared to the spectral pattern of archaeological and natural soils. Here we extend this study to a prehistoric pit formation in Hungary which has completely different environmental conditions compared to the site in Italy.

To identify reflection spectra of an archaeological feature, difference (D value) between an original spectrum and its modified spectrum is calculated for the 400 – 1000 nm spectral range. The modified spectrum is represented by the principal component values of natural soils allowing the spectrum to have a natural soil like feature. Therefore the D value indicates the degree of similarity of the spectrum to the spectral patterns of natural soils. The study will investigate average D values for archaeological and natural soils in Hungary and compare these to the result from Italy.

The D values for natural soils in Italy and Hungary were similar (varied between 0.04 and 0.17) although soil types and environmental conditions were different. However, the D values for archaeological soils differed. The archaeological soils in Italy, which had strong reddish colour, showed D values between 0.15 and 0.57, while for the archaeological soils in Hungary they ranged from 0.06 to 0.26, which were only slightly enhanced compared to the D values of natural soils. Such results indicate that the D values vary a lot depending on the type of archaeological material, and further investigation on the method to various archaeological sites are needed to improve and refine the method.