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Cropmarks used in aerial archaeology as special spatial indicators of soil features potentially applicable in soil mapping

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Cropmarks are a major factor in the effectiveness of traditional aerial archaeology. The positive and negative features shown up by cropmarks are the role of the different cultivated plants and the importance of precipitation and other elements of the physical environment. In co-operation with the experts of the Eötvös Loránd University a new research was initiated to compare the pedological features of cropmark plots (CMP) and non-cropmark plots (nCMP) in order to identify demonstrable differences between them. For this purpose, the spatial soil information on primary soil properties provided by DOSoReMI.hu was employed. To compensate for the inherent vagueness of spatial predictions, together with the fact that the definition of CMPs and nCMPs is somewhat indefinite, the comparisons were carried out using data-driven, statistical approaches. In the first round three pilot areas were investigated, where Chernozem and Meadow type soils proved to be correlated with the formation of cropmarks. Kolmogorov-Smirnov tests and Random Forest models showed a different relative predominance of pedological variables in each study area. The geomorphological differences between the study areas explain these variations satisfactorily. In the next round, the identified relationships between cropmarking and soil features are planned to be utilized in the spatial inference of soil properties, where crop-marking sites will represent a unique, spatially non-exhaustive auxiliary information.