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Prediction of hydromorphic soils using compound topographic index

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Terrain characteristics are often used as auxiliary data for prediction of different soil properties. The range of terrain characteristics is very wide. Primary or secondary terrain attributes can be exploited for chemical, biological and physical soil properties prediction. One of the most exploited terrain property is the compound topographic index (CTI). In this study, CTI was used as easily obtained auxiliary data via digital terrain model (DTM) for prediction of hydromorphic soil and for improved delineation of these soils in a detail scale map.

The study area (60 ha) consists of rather plain area in upper part of a larger watershed. The area has uniform geology formed by weathered granitic colluvial material. The soil cover consists of Cambisols, Stagnosols and Gleys. The CTI was derived from DTM with 10 meter pixel based on digitized contours with 1 meter vertical resolution. Area was subdivided to eight classes according to CTI value. Soil samples were taken in each of the class with respect to their areal extent. Samples were taken at 40 localities in total with the aim to describe whole range of CTI values. Hydromorphic features (% of reduced soil matrix) for all soil horizons were recorded at each location.

Relationship of CTI and hydromorphic features was described by linear regression model. This model was used for prediction of hydromorphic features for the whole area. The resulted map was used for correction of original soil map that originated from traditional soil survey in scale 1: 10 000 were the hydromorphic soils were overestimated compared to obtained results.