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Soil and Water Research

Mapping the topsoil pH and humus quality of forest soils in the North Bohemian Jizerské hory Mts. region with ordinary, universal, and regression kriging: cross-validation comparison

Vaš ť R., Pavlů L., Borůvka L., Drábek O., Nikodem A.:

Soil & Water Res., 8 (2013): 97-104

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North Bohemia belongs to one of the most heavily industrialized and polluted regions in Europe. The enormous acid deposition which culminated in the 1970s has largely contributed to the accelerated acidification process in the soils and consequently to the wide forest decline in North Bohemian mountains. In this paper we map the active topsoil pH and humus quality with ordinary, universal, and regression kriging and compare the accuracy of resulting maps with cross-validation. For the regression kriging we use two types of spatially exhaustive auxiliary information, first the altitude derived from digital elevation model and second the land cover classes derived from satellite imagery. The leave-one-out (cross-validation) statistics, i.e. mean error, root mean squared error, and mean squared deviation ratio, are taken for comparison since they are widely accepted as measurements of the accuracy of digital soil maps. The results show that the regression kriging is superior over other kriging methods in this case. Out of 97 sampling sites the

regression kriging with land cover classes is the best predictor at 32 sites for pH and at 30 sites for humus quality, the regression kriging with altitude at 31 and 25 sites, the universal kriging at 21 and 23 sites, and the ordinary kriging at 13 and 18 sites. The highest number of best predictions for regression kriging implies that the topsoil pH and humus quality are driven approximately equally by land cover and altitude and little less by pure geographic position. Furthermore, the universal kriging maps show a northeast to southwest spatial trend of topsoil pH and a northwest to southeast spatial trend for humus quality.

Keywords:

Black Triangle; digital soil mapping; geostatistics; map accuracy

[[fulltext](#)]

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