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Mapping soil texture classes and optimization of the result by accuracy assessment

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There are increasing demands nowadays on spatial soil information in order to support environmental related and land use management decisions. The GlobalSoilMap.net (GSM) project aims to make a new digital soil map of the world using state-of-the-art and emerging technologies for soil mapping and predicting soil properties at fine resolution. Sand, silt and clay are among the mandatory GSM soil properties. Furthermore, soil texture class information is input data of significant agro-meteorological and hydrological models.
Our present work aims to compare and evaluate different digital soil mapping methods and variables for producing the most accurate spatial prediction of texture classes in Hungary. In addition to the Hungarian Soil Information and Monitoring System as our basic data, digital elevation model and its derived components, geological database, and physical property maps of the Digital Kreybig Soil Information System have been applied as auxiliary elements.
Two approaches have been applied for the mapping process. At first the sand, silt and clay rasters have been computed independently using regression kriging (RK). From these rasters, according to the USDA categories, we have compiled the texture class map. Different combinations of reference and training soil data and auxiliary covariables have resulted several different maps. However, these results consequentially include the uncertainty factor of the three kriged rasters.
Therefore we have suited data mining methods as the other approach of digital soil mapping. By working out of classification trees and random forests we have got directly the texture class maps. In this way the various results can be compared to the RK maps.
The performance of the different methods and data has been examined by testing the accuracy of the geostatistically computed and the directly classified results. We have used the GSM methodology to assess the most predictive and accurate way for getting the best among the several result maps.

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