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# Digital mapping of soil properties in Zala County, Hungary for the support of county-level spatial planning and land management

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The main objective of the DOSoReMI.hu (Digital, Optimized, Soil Related Maps and Information in Hungary) project is to significantly extend the potential, how demands on spatial soil related information could be satisfied in Hungary. Although a great amount of soil information is available due to former mappings and surveys, there are more and more frequently emerging discrepancies between the available and the expected data. The gaps are planned to be filled with optimized DSM products heavily based on legacy soil data, which still represent a valuable treasure of soil information at the present time.
Impact assessment of the forecasted climate change and the analysis of the possibilities of the adaptation in the agriculture and forestry can be supported by scenario based land management modelling, whose results can be incorporated in spatial planning. This framework requires adequate, preferably timely and spatially detailed knowledge of the soil cover. For the satisfaction of these demands in Zala County (one of the nineteen counties of Hungary), the soil conditions of the agricultural areas were digitally mapped based on the most detailed, available recent and legacy soil data. The agri-environmental conditions were characterized according to the 1:10,000 scale genetic soil mapping methodology and the category system applied in the Hungarian soil-agricultural chemistry practice. The factors constraining the fertility of soils were featured according to the biophysical criteria system elaborated for the delimitation of naturally handicapped areas in the EU. Production related soil functions were regionalized incorporating agro-meteorological modelling.
The appropriate derivatives of a 20m digital elevation model were used in the analysis. Multitemporal MODIS products were selected from the period of 2009-2011 representing different parts of the growing season and years with various climatic conditions. Additionally two climatic data layers, the 1:100.000 Geological Map of Hungary and the map of groundwater depth were used as auxiliary environmental covariables.
Various soil related information were mapped in three distinct sets: (i) basic soil properties determining agri-environmental conditions (soil type according to the Hungarian genetic classification, rootable depth, sand and clay content for the 1st and 2nd soil layers, pH, OM and carbonate content for the plough layer); (ii) biophysical criteria of natural handicaps defined by common European system and (iii) agro-meteorologically modelled yield values for different crops, meteorological and management scenarios. The applied method(s) for the spatial inference of specific themes was/were suitably selected: regression and classification trees for categorical data, indicator kriging for probabilistic management of criterion information; and typically regression kriging for quantitative data. Our paper will present the mapping processes themselves, the resulted maps and some conclusions drawn from the experiences.

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