Renewal of the Hungarian Soil Spatial Data Infrastructure by goal oriented digital soil mapping

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Due to former soil surveys and mapping activities significant amount of soil information has accumulated in Hungary. In traditional soil mapping the creation of a new map was troublesome and laborious. As a consequence, robust maps were elaborated and rather the demands were fitted to the available map products. Until recently spatial soil information demands have been serviced with the available datasets either in their actual form or after certain specific and often enforced, thematic and spatial inference. Considerable imperfection may occur in the accuracy and reliability of the map products, since there might be significant discrepancies between the available data and the expected information. The DOSoReMI.hu (Digital, Optimized, Soil Related Maps and Information in Hungary) project was started intentionally for the renewal of the national soil spatial infrastructure in Hungary. During our activities we have significantly extended the potential, how soil information requirements could be satisfied. Soil property, soil type as well as functional soil maps were targeted. The set of the applied digital soil mapping techniques has been gradually broadened incorporating and eventually integrating geostatistical, data mining and GIS tools.

Soil property maps have been compiled partly according to GSM.net specifications, partly by slightly or more strictly changing some of their predefined parameters (depth intervals, pixel size, property etc.) according to the specific demands on the final products. The elaborated primary maps were further processed, since even DOSoReMI.hu intended to take steps for the regionalization of higher level soil information (processes, functions, and services) involving crop models in the spatial modelling. The framework of DOSoReMI.hu also provides opportunity for the elaboration of goal specific soil maps, with the prescription of the parameters (thematic, resolution, accuracy, reliability etc.) characterizing the map product. As a result, unique digital soil map products (in a more general meaning) were elaborated regionalizing specific soil (related) features, which were never mapped before, even nationally with high (~1 ha) spatial resolution. Based upon the collected experiences, the full range of GSM.net products were also targeted. The web publishing of the results was also elaborated creating a proper WMS environment. Our paper will present the resulted national maps furthermore some conclusions drawn from the experiences.

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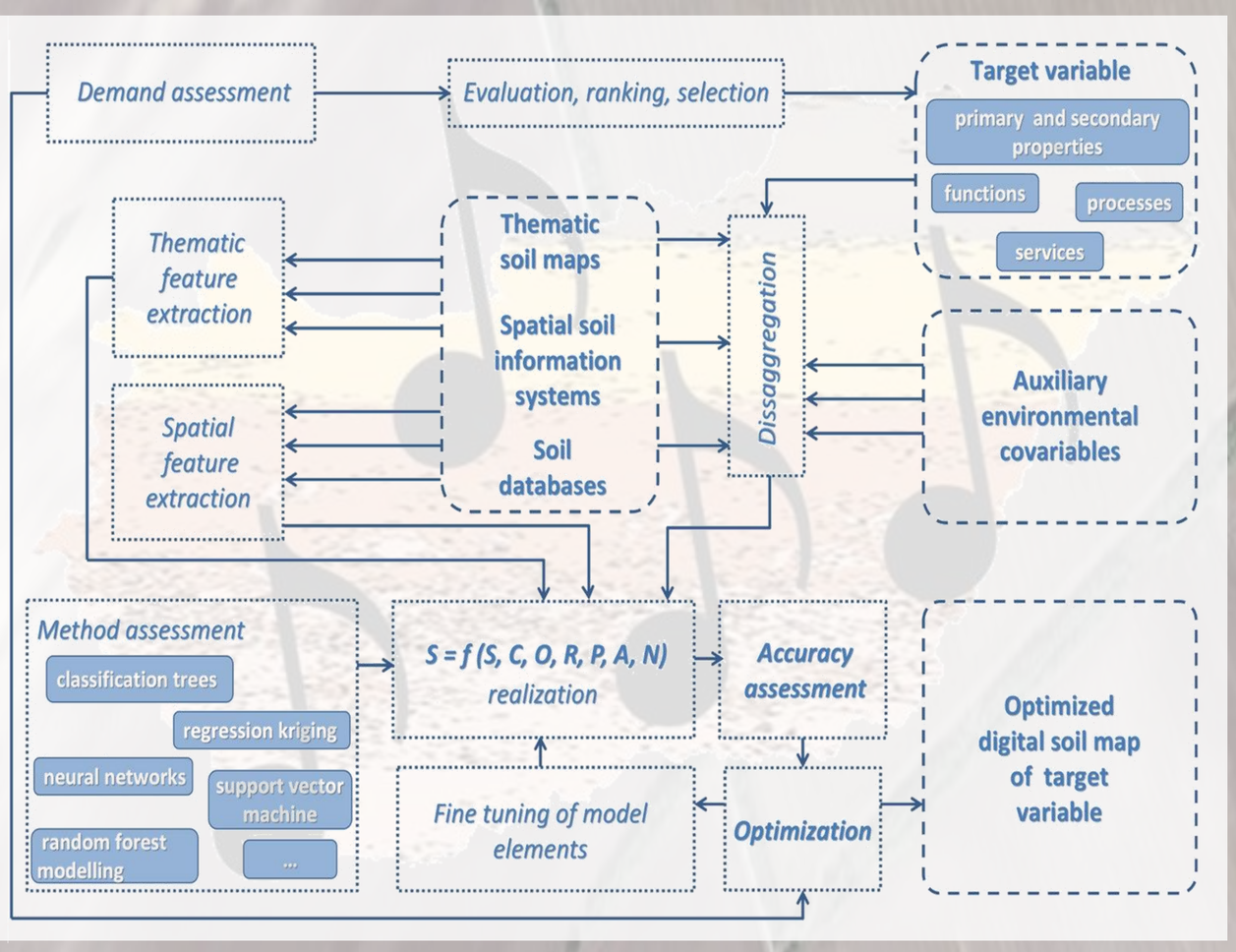
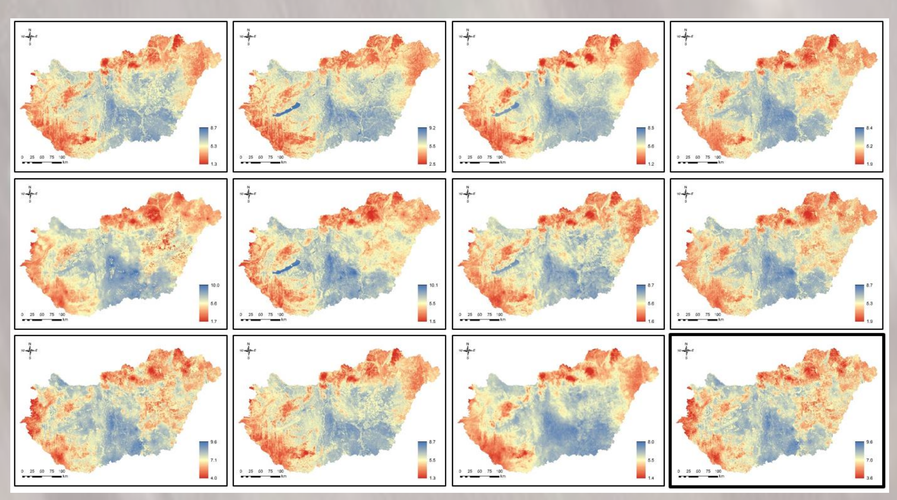
FRAMEWORK OF THE DOSOREMI.HU PROJECT



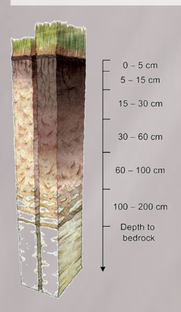
Target variable					
Primary soil property			Soil class		
	layer			layer	
whole profile	GSM.net standard	specific depth interval	whole profile	GSM.net standard	specific depth interval
standard or unique feature			standard or unique feature		
Secondary soil property			Secondary soil class		
	layer			layer	
whole profile	GSM.net standard	specific depth interval	whole profile	GSM.net standard	specific depth interval
standard or unique feature			standard or unique feature		
Soil functions, services					



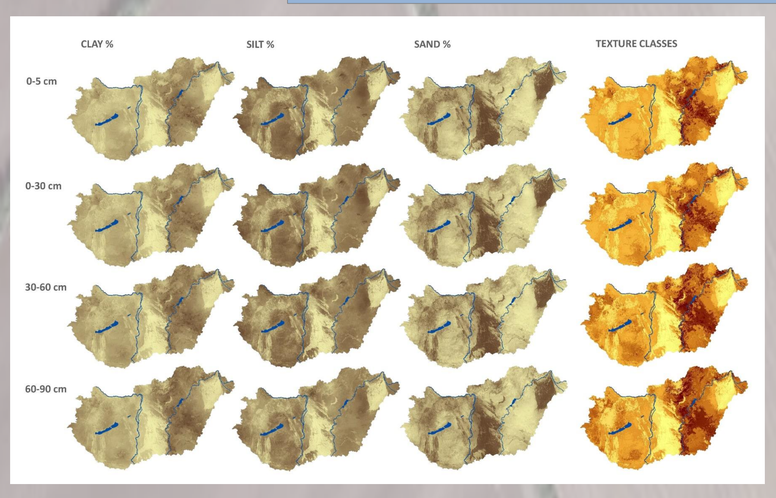
Multiple realizations → Accuracy, reliability, applicability assessment → Selected, optimized result

RESULTS OF THE DOSOREMI.HU PROJECT

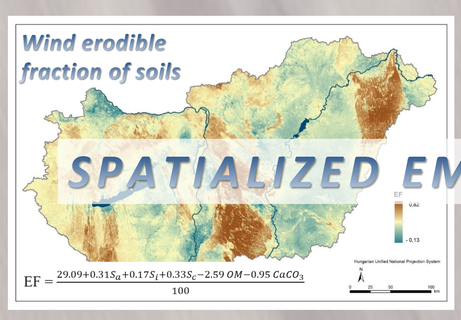
PRODUCTS ACCORDING TO AND DIFFERING FROM GSM.NET SPECIFICATIONS

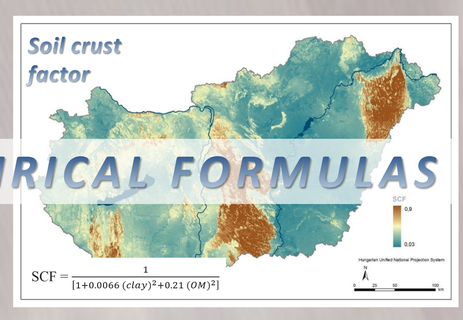


GlobalSoilMap.net

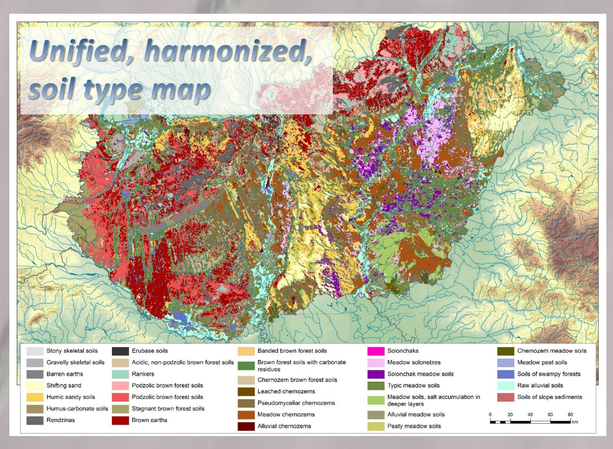


SPATIALIZED EMPIRICAL FORMULAS



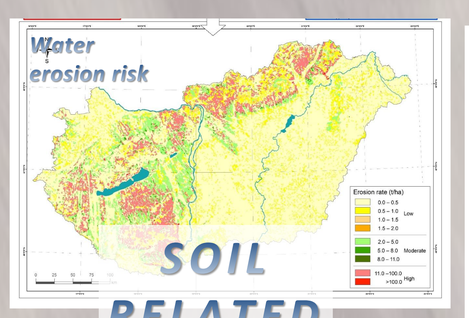


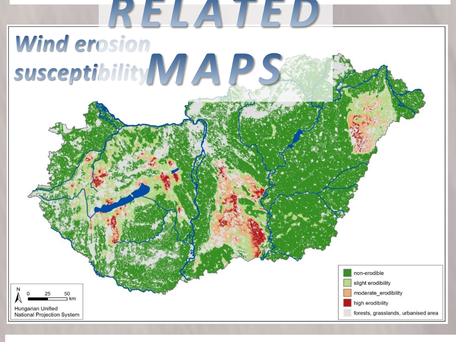
BEYOND PRIMARY SOIL PROPERTY MAPS

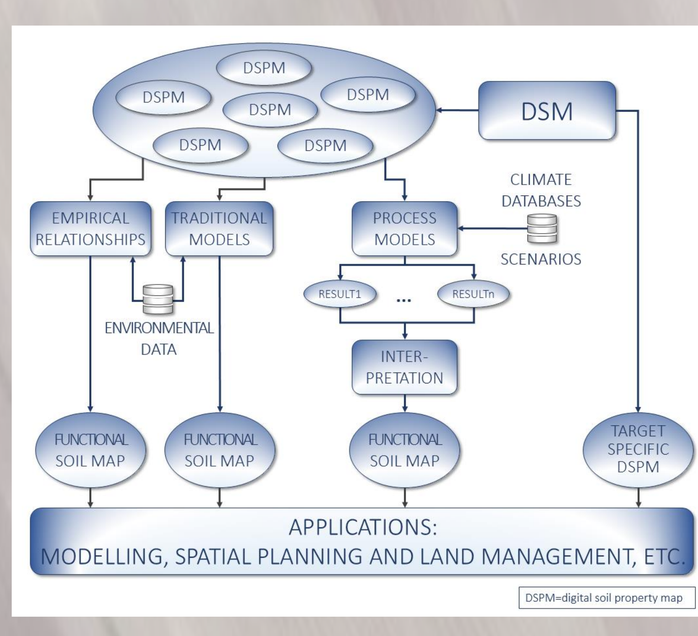


spatial resolution 100 m			profile	topsoil-subsoil stratification		uniform layers			layers of specific model			GSM.net standard layers					
				topsoil	subsoil	0-30 cm	30-60 cm	60-90 cm	0-20 cm	20-50 cm	50-100 cm	0-5 cm	5-15 cm	15-30 cm	30-60 cm	60-100 cm	100-200 cm
primary soil properties	particle size fractions [%]	clay															
		silt															
		sand															
	texture class (Hungarian)																
	texture class (USDA)																
	available water content																
	bulk density																
	organic matter content																
	pH																
	carbonate content																
	genetic soil type																
	rooting depth																
	...																
target specific soil maps																	
				available			not relevant				be scheduled						

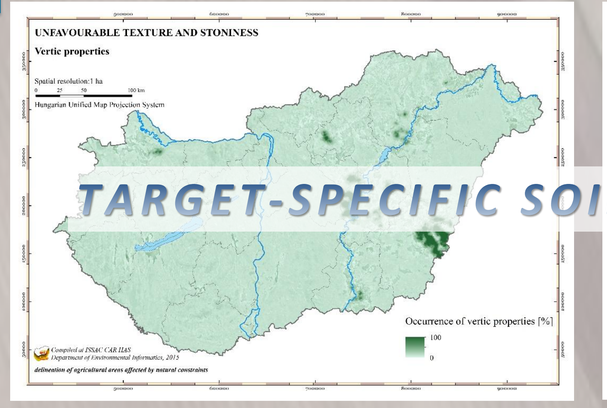
SOIL RELATED MAPS

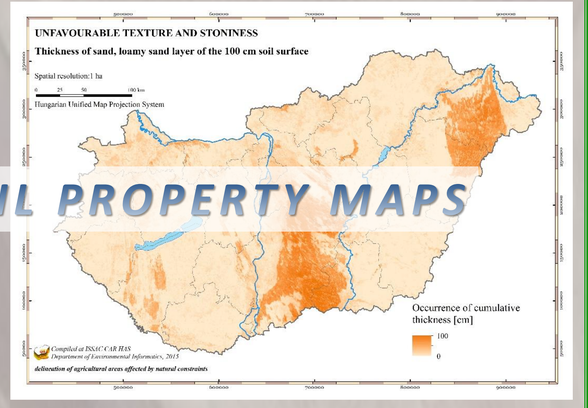




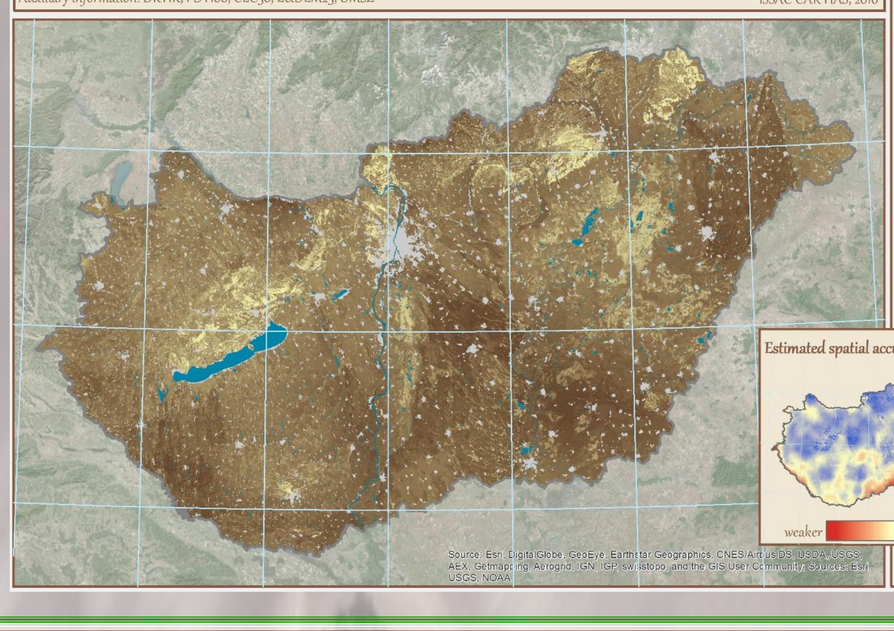


TARGET-SPECIFIC SOIL PROPERTY MAPS





Spatial resolution, extent, scale → Thematic, property, parameter, representation → Quality, accuracy, reliability



SPATIALIZED MODEL RESULTS