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HORUS Platform for Assessment of Soil Characteristics based on Distributed Processing of Sentinel-2 Satellite Data

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Currently the main soil data sources are represented by field studies, sample analysis and in-situ offline sensors. Soil maps are created by measuring soil characteristics in a very limited number of points and by defining areas in which these characteristics should be the same. By integrating remote sensing data, the resolution of this data could be increased. The processing of satellite data supplied by Sentinel-2 gives a higher resolution of supervised region, up to 10m, and will provide parameters for the majority of areas, even for the inaccessible ones. The measurements in the field are collected periodically and are used to calibrate the remote sensing data.
HORUS Toolbox [1] enables the enhancement of the measured data in the field with remote sensing data. By regression methods we can estimate soil characteristics in other points, not only in the measured ones. The solution we propose allows users to identify the Sentinel-2 images from ESA repository that should be used, extract from the selected spectral bands the values corresponding to the field measured points, apply some computation on them, compute regression, identify the influence of various parameters and generate new soil maps based on remote sensing data and measured data.
HORUS Toolbox is based on the BIGEARTH [2] software platform which allows processing of Earth Observation data coming from different sources by defining the complex processing in WorDeL [3] description language. Grass GIS and ESA's SNAP are some of the software tools that are used to process remote sensing data and other kind of data. It also enables specialists to easily scale the processing over distributed architectures, according to their specific needs and resources.

Main references for further information:
[1] HORUS project, http://cgis.utcluj.ro/projects/horus
[2] BigEarth project, http://cgis.utcluj.ro/projects/bigearth
[3] Constantin Nandra, Dorian Gorgan: "Defining Earth data batch processing tasks by means of a flexible workflow description language", ISPRS Ann. Photogramm. Remote Sens. Spatial Inf. Sci., III-4, 59-66, (2016).