Geophysical Research Abstracts
Vol. 14, EGU2012-12771, 2012
EGU General Assembly 2012

Concepts for landscape scale digital soil mapping using field scale geophysical sensor data

T. Behrens (1), K. Schmidt (1), U. Werban (2), P. Dietrich (2), and T. Scholten (1)

(1) Soil Science and Geomorphology , Uni Tübingen, Tübingen, Germany, (2) Department Monitoring & Exploration Technologies, UFZ, Leipzig

An essential prerequisite for site-specific soil protection and restoration, alongside sustainable land use, water management, and environmental management, is the availability of high-resolution soil property maps. One aim of the iSOIL project (EU FP7) was the validation of the potential of field-scale proximal soil sensing for landscape-scale Digital Soil Mapping (DSM).
Within the iSOIL project we applied a combination of several preprocessing approaches to determine where the sensors should be applied. In a first step the landscape was segmented into homogeneous landscape units and in a second step representative patches or spatial subsets were derived as core areas for soil sensing.

This talk presents and compares multiple approaches to integrate these patch-scale geophysical sensing data (EM and Gamma) into landscape scale DSM. Hyper-scale digital terrain features (ConMap) were used as the only predictors for building the regression models.

Eighty calibration samples covering the feature space of the interpolated geophysical sensor data were used for building the soil property models. Validation was based on 20 fully independent samples outside the sampling areas covering the geographical space.
Validation shows that some approaches do not show any benefit compared to our benchmark model, where no geophysical data was included. However, one concept returns a boost in R^2 validation accuracy of up to 11 %. This demonstrates that it is crucial how the field scale geophysical data is included in landscape scale DSM frameworks and that field scale geophysical data can successfully be used for landscape scale DSM.