



## Using Near Infrared Spectroscopy in Digital Soil Mapping

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During the last decade, Visible and Near Infrared Spectroscopy (VNIRS) has become a valuable tool for soil scientists. Commonly, it is used to estimate soil characteristics, e.g. organic carbon, nitrogen or clay content. Numerous samples can be measured by VNIRS rapidly and at low costs, thus it is an interesting tool for digital soil mapping, too. Many soil characteristics are reflected in the spectral data (the spectra) of soils, so the spectra may be used in a more general way than only for estimating soil properties. This work will show that VNIRS can be used in digital soil mapping to assess the soil variability within a defined area.

The application for VNIRS in soil mapping is illustrated using soil samples and data collected for the iSoil project (*FP7 collaborative project iSOIL – Interactions between soil related sciences – Linking geophysics, soil science and digital soil mapping, no. 211386*) at fields near Rosslau, Germany. The dataset consists of 168 samples from 56 sampling points and three soil layers (0-10, 10-30 and 30-70 cm). The samples' spectra are used to inspect the soil variability within the sample area. Using compression techniques like principle components analysis and wavelet decomposition the soil variability can be captured mathematically and visualized. This information helps to decide where additional samples should be collected and which samples should be forwarded for laboratory analysis. Soil properties of the remaining samples are estimated based on the laboratory samples. This allows saving considerable amounts of money and time – or allows analysing a bigger number of samples with same time and effort. Often, more information about the sampling area is present (e.g. elevation model, vegetation, soil type, etc.). This information may be used together with the soil spectra, improving the quality of the generated results.