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Austrian Soil Spectral Library for future soil fertility assessments

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The interest in soil analyses with visible and near infrared spectroscopy (Vis-NIRS, ~350-2500nm) has increased rapidly (Nocita et al., 2015; Gholizadeh et al., 2013, Stenberg et al., 2010) due to simple use of the technique and its fastness compared to wet and dry chemistry. Vis-NIR soil spectroscopy has been identified as one of the proximal sensor techniques with most information about organic matter and clay minerals (Gholizadeh et al., 2013) that is very interesting for the agricultural community looking for ways to rapidly assess how management practices affect soil organic carbon stocks, for example. Organic molecules and functional groups in the organic matter absorb strongly in the Vis-NIR range and therefore relate to organic carbon (Stenberg et al., 2010).

In order to interpret, validate and calibrate the Vis-NIR spectra, reference data analysed with wet and dry chemistry is needed. Here, we will present the development and use of the Austrian soil spectral library that currently consists of around 600 agricultural soil samples. The soil spectral library has been built up from representative agricultural air-dried soil samples from farmers and agricultural long-term experiments that have first been analysed with wet and dry chemistry for soil organic matter characteristics including total organic carbon (TOC), labile carbon, total nitrogen and potentially mineralisable nitrogen, among other soil fertility characteristics. The soil spectral library is continuously being extended by more representative agricultural soil samples from farmers and long-term experiments. Its harmonisation is being carried out under the EJP SOIL ProbeField project on a European scale as well as under the global GLOSOLAN initiative on soil spectroscopy cooperation. This is to ensure generic, robust and well performing models that could be used in a simple and fast manner on local, regional and national scales in Austria, as well as to be connected to larger geographical and soil type coverage on a European and global scales through ProbeField and GLOSOLAN networks.

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