SPECTRAL EVOLUTION

Measuring Total Carbon for Carbon Sequestration

Climate change and the rise of CO_2 in the atmosphere has highlighted the possibilities of carbon sequestration in soil. Estimating sequestration possibilities involves accurately measuring Total Carbon (TC). TC is a measure of the organic and inorganic carbon contained within soil. TC in soil is a result of the decomposition of plant and animal matter, living and dead microorganisms, roots from plants, soil biota (which includes earthworms, nematodes, fungi, protozoa, bacteria, etc.) and carbon minerals.

TC affects soil characteristics, including color, nutrient capacity (cation and anion exchange capacity) nutrient stability and turnover, and subsequently water relationships, aeration, and cultivation. The accurate measurement of TC can result in better crop management for cultivated land and better understanding of available carbon pools in uncultivated land. VIS/NIR field spectroscopy offers a fast, accurate and affordable alternative to lab analysis of TC—an alternative that works without destroying the sample. Spectral evolution's PSR+ spectroradiometer is specifically designed for spectral analysis *in situ*. It's rugged and reliable with a range of direct attached lenses as well as fiber mount options with a steel-jacketed fiber optic cable that's rugged and field swappable. A full range spectroradiometer, it covers wavelengths from 350 to 2500nm—UV/VIS/NIR.

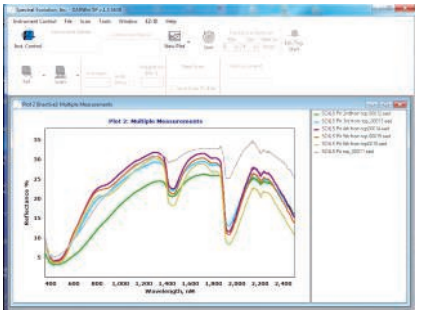
In a typical soil spectra, TC spectral features would be seen at 400, 1000, 1400, 1900-2100 and 2200-2400nm. To determine TC it is important to have high resolution spectra for analysis. The spectra from TC measurements are automatically saved in ASCII format and can be further analyzed using multivariate statistical tools such as PLSR and chemometrics analysis and spectral libraries built for predictive modeling of soils.

Spectral Evolution's PSR+ features high resolution and enhanced sensitivity to allow you to quickly collect clear spectra. Auto-shutter, auto-exposure, auto-dark current capabilities mean no manual optimization between scans. For soil analysis, the PSR+ can be equipped with a rugged and reliable sample contact probe, as well as a benchtop probe with sample compactor. The PSR+ is ideal for taking scans of vertical or horizontal soil layers in a pit.

Our DARWin SP Data Acquisition software gives you complete control of your instrument interface, access to vegetation indices as well as the USGS sample library, and saves all spectra and metadata as ASCII files for use with 3rd party software such as ENVI, TSG, R, Unscrambler and GRAMS. Optional EZ-ID sample identification software can help you match your target samples to the USGS, SpecMIN and GeoSPEC mineral spectral libraries to quickly identify clays. Or with the Custom Library Builder module, you can create your own soils and TC library by simply saving your metadata and scans.

NIR spectroscopy can be used in conjunction with complementary technologies, such as portable XRF where you can use the data from a PSR+ with the elemental analysis from XRF technology for a more complete picture of TC and other soil properties.

Soil analysis using NIR spectoradiometers like the PSR+ and RS-3500 can measure total carbon (TC), water, carbon, nitrogen, clay, and pH.



DARWin SP Data Acquisition software is included with every SPECTRAL EVOLUTION spectroradiometer. The software allows you to display multiple scans of different soil samples for comparison.

26 Parkridge Road ◊ Suite 104
Haverhill, MA 01835 USA
Tel: 978 687-1833 ◊ Fax: 978 945-0372
Email: sales@spectralevolution.com
www.spectralevolution.com