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The Soil Spectroscopy Group and the development of a global soil spectral library

R. Viscarra Rossel on behalf of The Soil Spectroscopy Group http://groups.google.com/group/soil-spectroscopy
CSIRO Land & Water, Bruce E. Butler Laboratory, GPO Box 1666 Canberra ACT 2601, Australia

This collaboration aims to develop a *global soil spectral library* and to establish a community of practice for soil spectroscopy. This will help progress soil spectroscopy from an almost purely research tool to a more widely adopted and useful technique for soil analysis, proximal soil sensing, soil monitoring and digital soil mapping.

The initiative started in April 2008 with a proposal for the project to be conducted in a number of stages to investigate the following topics:

1. Global soil diversity and variation can be characterised using diffuse reflectance spectra.
2. Soil spectral calibrations can be used to predict soil properties globally.
3. Soil spectroscopy can be a useful tool for digital soil mapping.

Currently, the soil spectral library is being developed using legacy soil organic carbon (OC) and clay content data and vis-NIR (350–2500 nm) spectra, but in future we aim to include other soil properties and mid-IR (2500–25000 nm) spectra.

The group already has more than 40 collaborators from six continents and 20 countries and the library consists of 5223 spectra from 43 countries.

The library accounts for spectra from approximately only 22% of the world's countries, some of which are poorly represented with only very few spectra. We would like to encourage participation from as many countries as possible, particularly, we would like contributions from counties in Central and South America, Mexico, Canada, Russia and countries in Eastern Europe, Africa and Asia. We are missing a lot of countries and for some, e.g. China we have only very few data!

Do you want to join the group and contribute spectra to the global library?

The requirements for contributing spectra to the global library are as follows:

- Spectra collected in the 350–2500 nm range every 1 nm.
- At least soil OC and clay content data but also any other soil chemical, physical, biological and mineralogical data, noting which analytical techniques were used.
- Coordinates (in WGS84 format) for each sample.
- Soil classification for each sample, preferably using FAO-WRB (FAO, 1998).
- Future access to soil samples for mid-IR scanning.

If you do not have all of the requested metadata for every sample, but would like to contribute to the library, please let us know. Also, if you do not have access to a spectrometer but have a good set of soils that you would like to contribute to the library, we can arrange to have the soils scanned at CSIRO in Australia or in a collaborating

institution nearer to you. We have done this with a number of countries already. There are leading collaborators in each continent: Bo Stenberg in Europe, David Brown in USA, Alexandre Dematte in South America, Keith Shepherd in Africa, Eyal Ben-Dor in the Middle East and Asia and Raphael Viscarra Rossel in Oceania and Asia.

To make this work we need participation from as many people around the world as possible. If you are interested in contributing spectra to the global library please send me an email (raphael.viscarra-rossel@csiro.au) and join the group!