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SpecBase - A Virtual Research Environment for Hyperspectral Remote Sensing

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Remote sensing methods are able to quantify the electromagnetic reflections or emissions of the Earth's surface materials and artefacts. The properties of these materials affect the reflectance, absorption or transmission of electromagnetic radiation at specific wavelengths. As a consequence, each material generates characteristic electromagnetic spectra that can be quantitatively analysed. For research purposes, the compilation and comparison of so-called reference spectra as well as the management of spectra from laboratory and field studies is essential. The workflows underlying the creation of reference spectra share characteristics with many other research fields in earth sciences in that they have many elements in common but sometimes require ad-hoc changes. In practice, the process that leads to the creation of a reference spectrum is often only poorly documented and the resulting data are accessible to only a small group of users. The increasing application of hyperspectral remote sensing techniques calls for a better dissemination and documentation of available reference spectra.

The aim of SpecBase is to offer researchers in hyperspectral remote sensing a virtual research environment (VRE) for the creation, documentation and dissemination of reference spectra. A core component is a data repository that allows versioning and roll-back of intermediate products in the workflow leading to new reference spectra. Once a reference spectrum is ready for publication it can be published and made citeable by assigning a Digital Object Identifier (DOI ®) through the DataCite service for publication of scientific data. The repository is supplemented by web 2.0 tools (user blog, wiki) to support the documentation, discussion and review of the newly created reference spectra.

Important parts of the SpecBase project are the evaluation of the available web 2.0 tools and the analysis of the workflows leading to the creation of new reference spectra. Through the evaluation of web 2.0 tools we aim to find out which tools do or do not gain acceptance in this particular community, and why this happens. The analysis of workflows is intended as preparation for a second project phase where SpecBase will be extended by moving processes from their current execution on desktop workstations to external processing web-based services. A more formal description of these workflows will also help to improve the documentation of provenance information and the chaining of processing tools into orchestrated processing workflows.