1 PUBLISHABLE SUMMARY

In WP2, the development of scalable mapping tools, the spectral database structure, and the open access demonstrator are being developed. A SQLite-based spectral database is generated using the Python library "Spectral Python". The database's content includes information about the origin, collection name of the samples, measurement type, mineral names, purity indicators, measurement devices, meta-information of the spectrometers, pre-defined spectral features for certain minerals, as well as the wavelengths and spectral measurements themselves. The content primarily comprises samples from the USGS spectral library v7, as well as measurements from project partners. Plans are underway to enrich the spectral library by incorporating measurements collected during the MultiMiner project. Additionally, synthetic spectra of mineral compositions will also be included. The open access demonstrator is a GUI-based step-by-step assistant that guides users through various data processing and analysis steps. This is achieved through multiple tabs within the GUI, which allow users to pre-select minerals from the spectral database for subsequent analysis. Different remote sensing image data (hyperspectral, multispectral, RGB, etc.) have their respective tabs to display, process, and classify the image data as color composites, classification maps, cluster maps, etc. Further configurations include analysis methods, the definition of output products (e.g., mineral distribution maps, proxy maps, etc.), and machine learning algorithms. The tool harmonizes the data spectrally and spatially to enable consistent and reproducible analyses. Additionally, data analysis can be enhanced by integrating expert knowledge through semantic maps, custom annotations, or pre-selections of minerals. Finally, by using the GUI, the user can process the remote sensing data in one well-structured workflow to generate the desired remote sensing products related to mineral exploration purposes.

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4.8 Pre-selection of potential mineral endmembers

The minerals can be pre-selected based on their attributes like *purity*, *measurement type*, or *spectrometer name* (Figure 4). A CSV file containing the to-be-considered endmember minerals can also be loaded. The selected minerals could result from knowledge about possible mineral appearance by field visits, previous investigations, developed models of a certain deposit or expert knowledge about the targeted mineralisation.

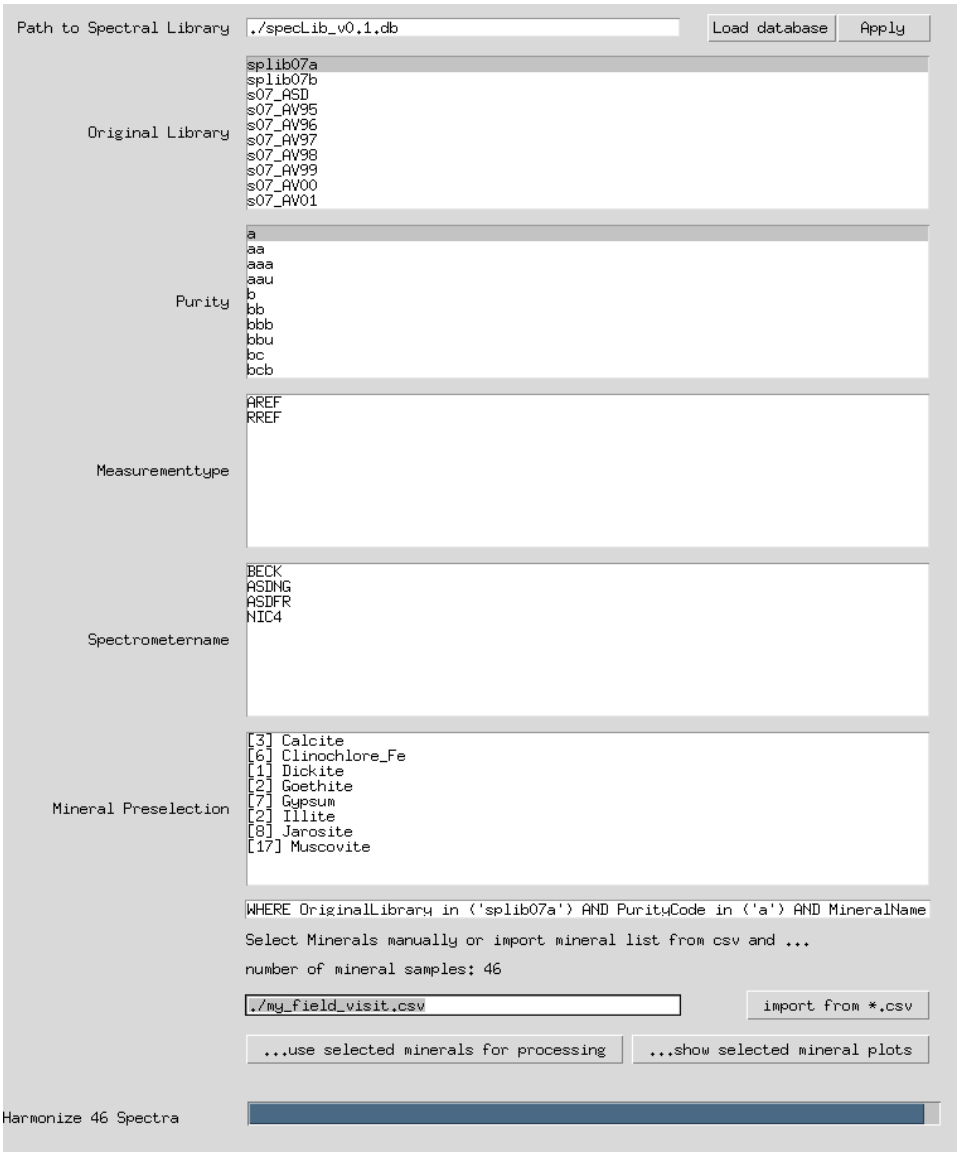

Figure 4. Pre-Selection of Mineral Spectra (endmember selection).

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