EnMAP-Box 3
Visualisierung und Analyse von EnMAP Daten

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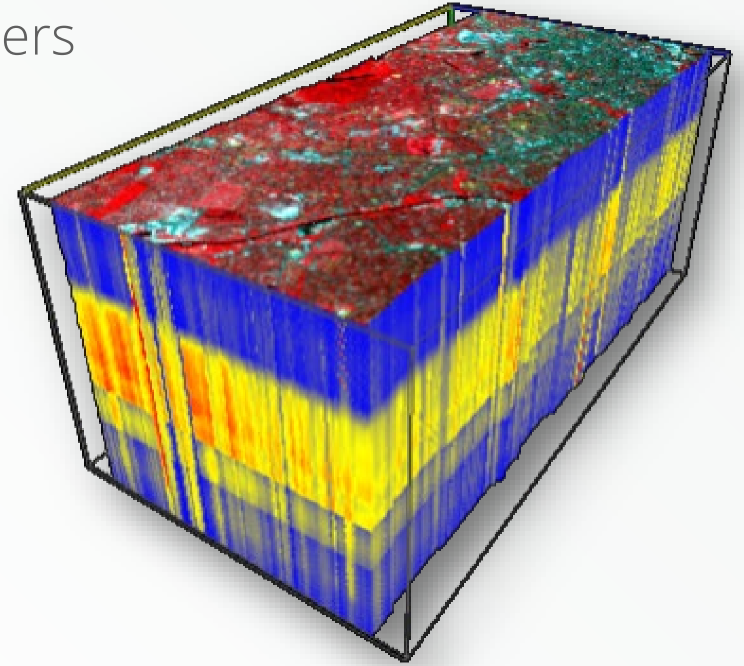
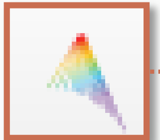
EnMAP-Box – Motivation and Aims

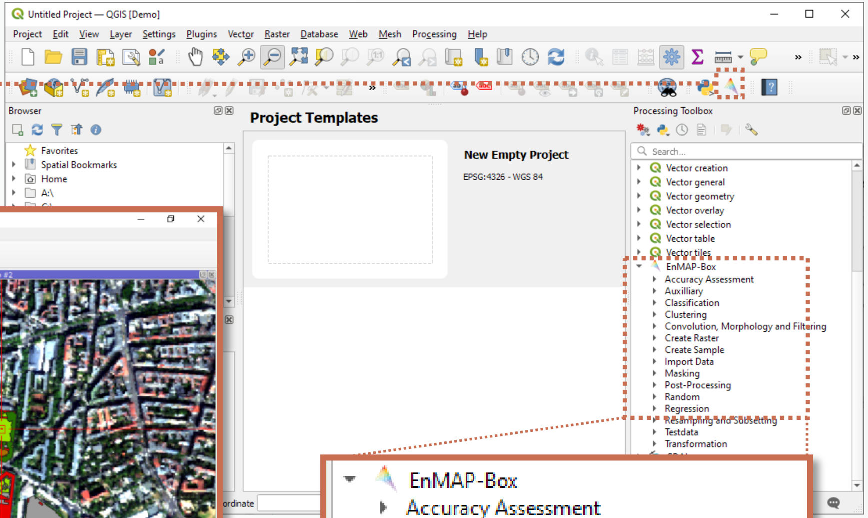
- Offer a free and open source environment for visualizing and analyzing EnMAP data
- Increase the number of EnMAP data users
- Integrate full GIS functionality with advanced image/spectral processing
- Suite of application-oriented advanced Workflows (Vegetation, Geology, …)
- Foster the availability and exchange of state-of-the-art approaches for the analysis of imaging spectroscopy data and spectral libraries

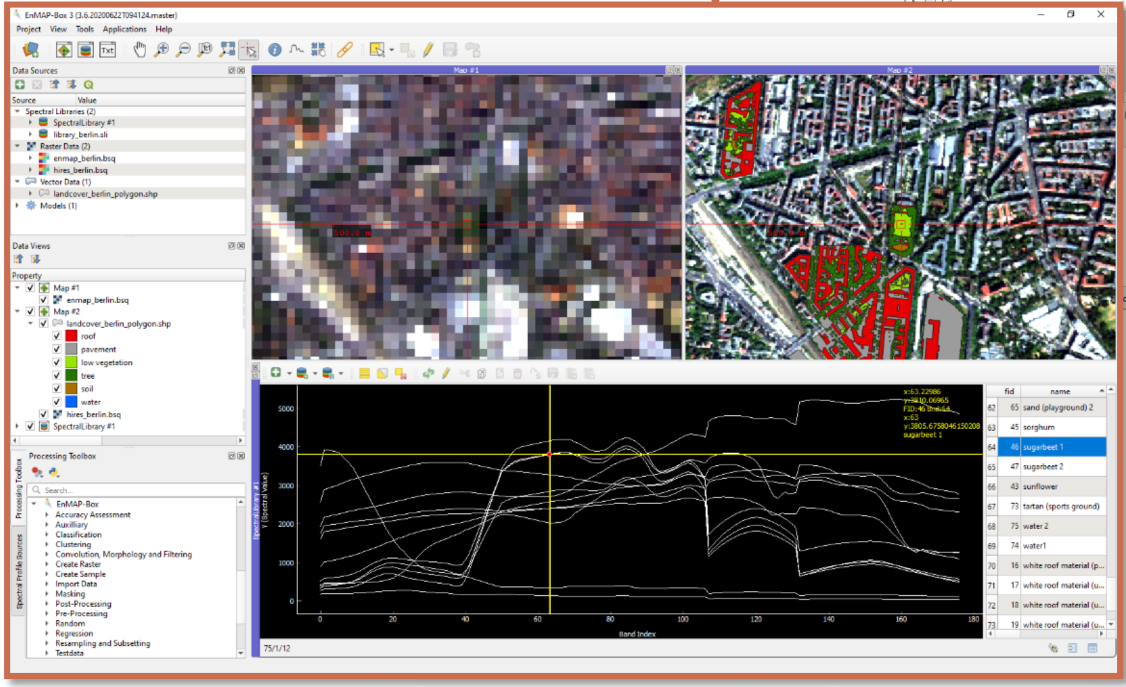


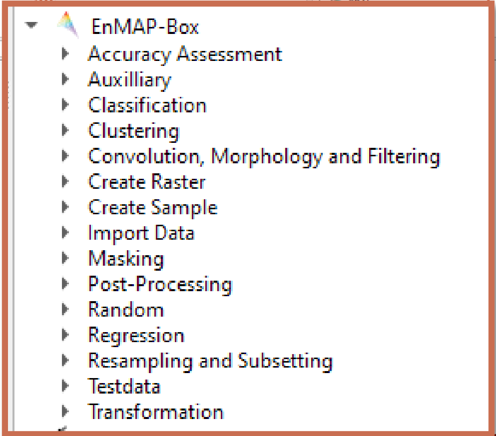
EnMAP-Box – Imaging Spectroscopy in QGIS

- EnMAP-Box GUI and Algorithm Provider

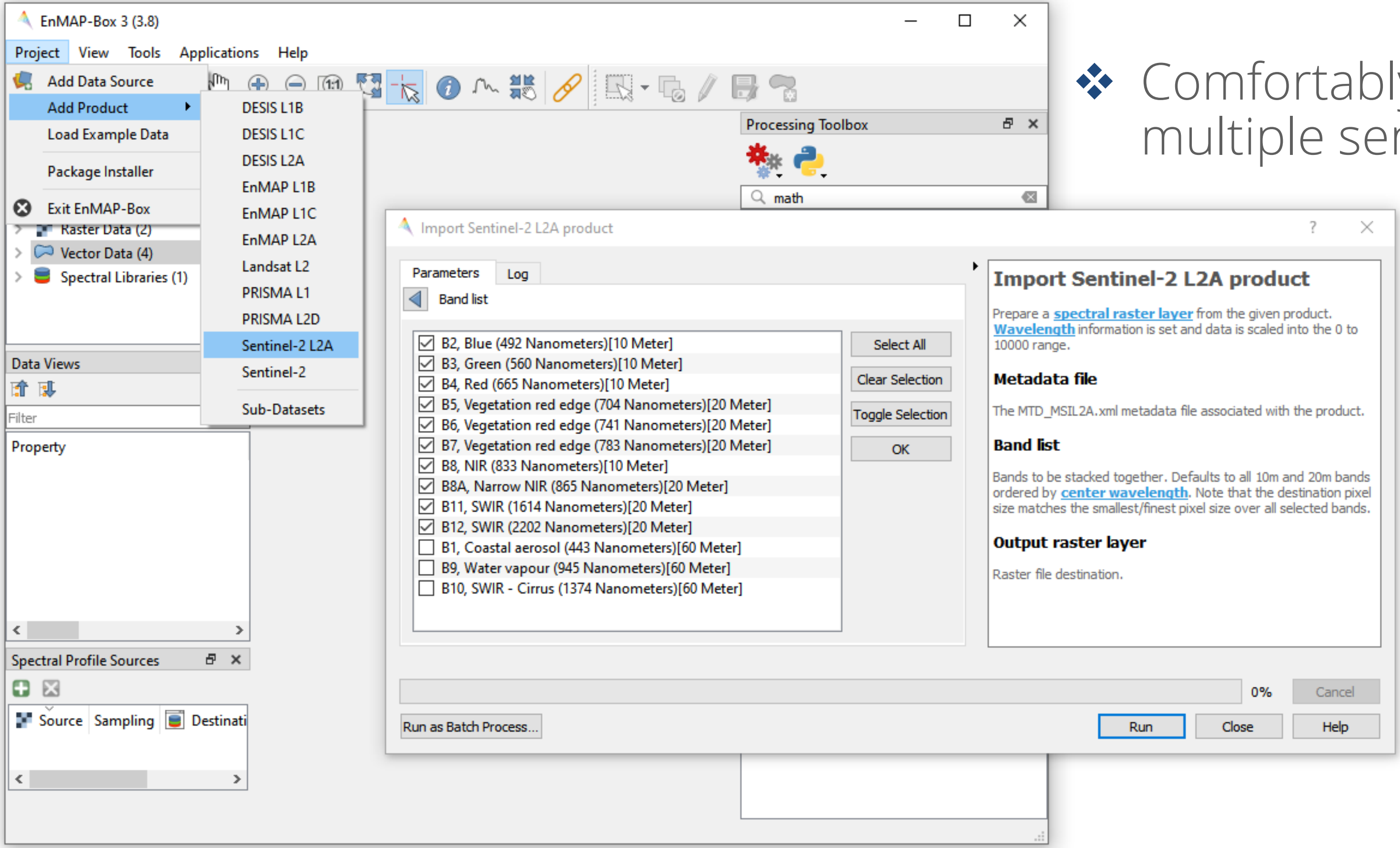






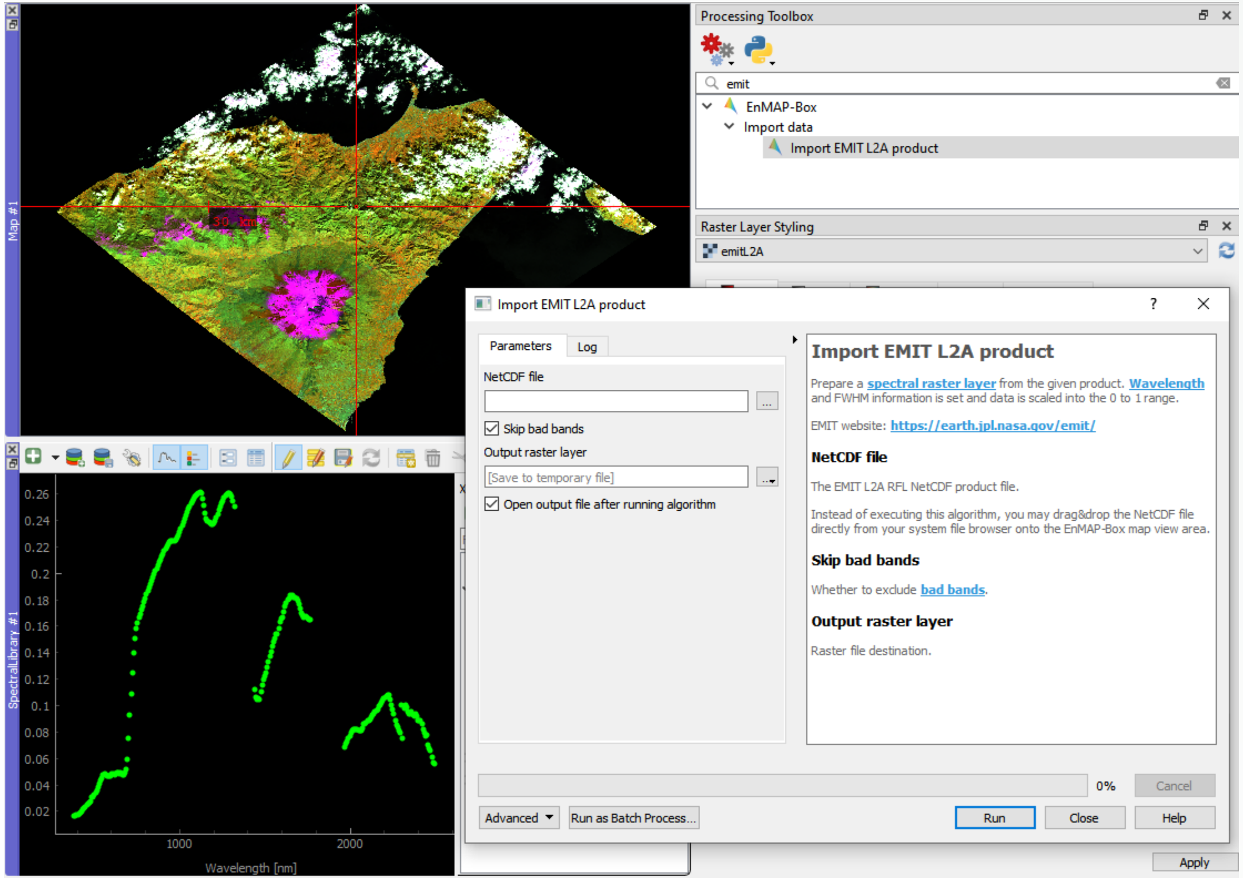


Create Sensor Synergies



- Comfortably import multiple sensors

Create Sensor Synergies

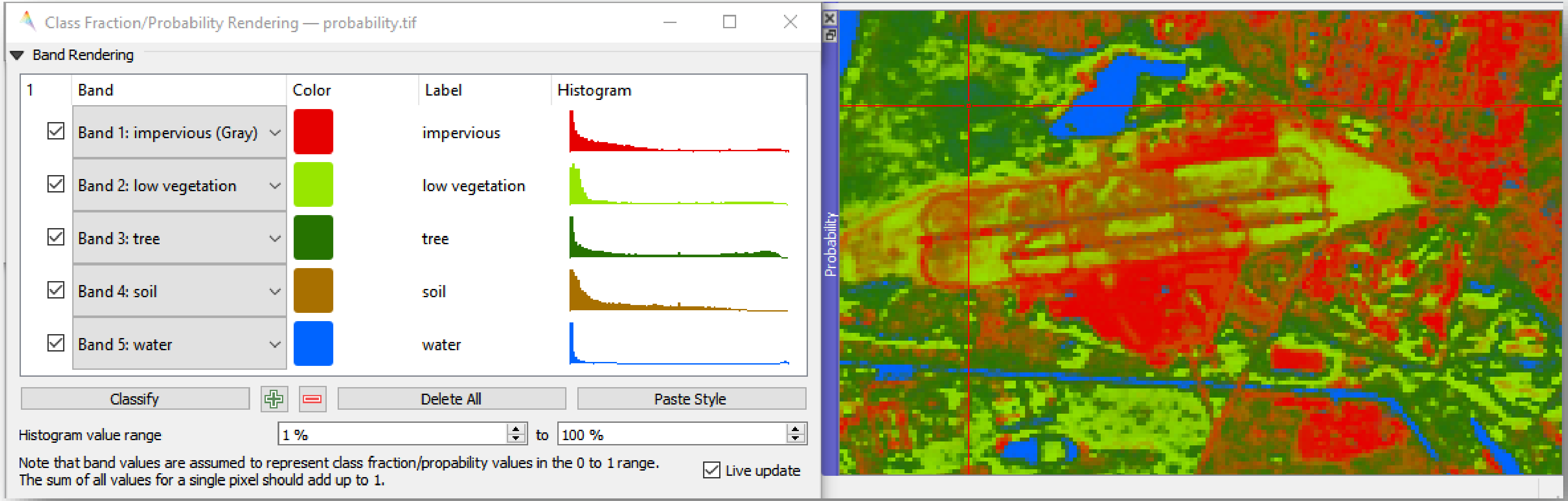


Various imaging spectrometers

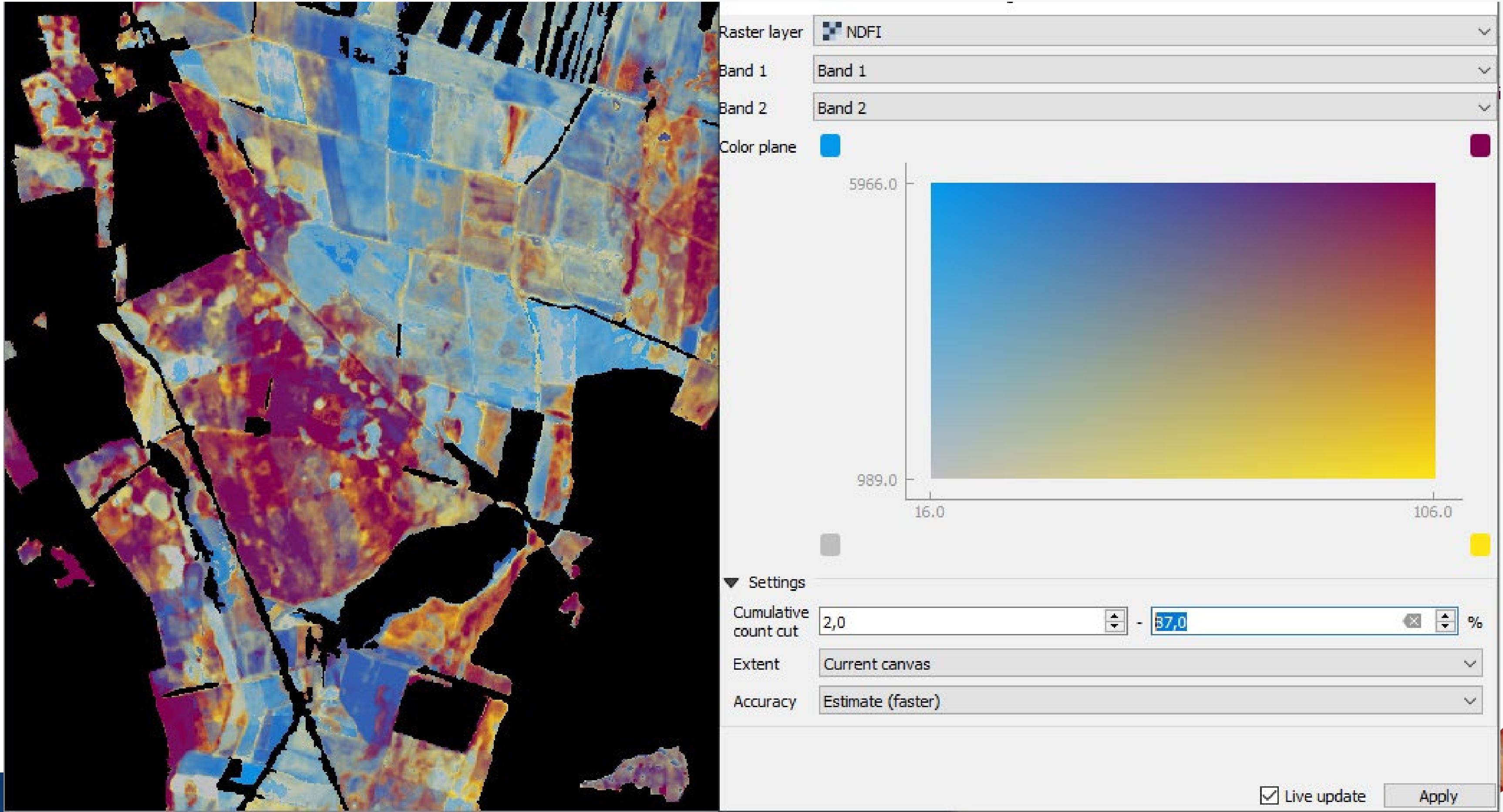
- PRISMA
- DESIS
- EMIT

Basic Tools – Class Fraction Statistics

- General tools optimized for quantitative results from EnMAP products

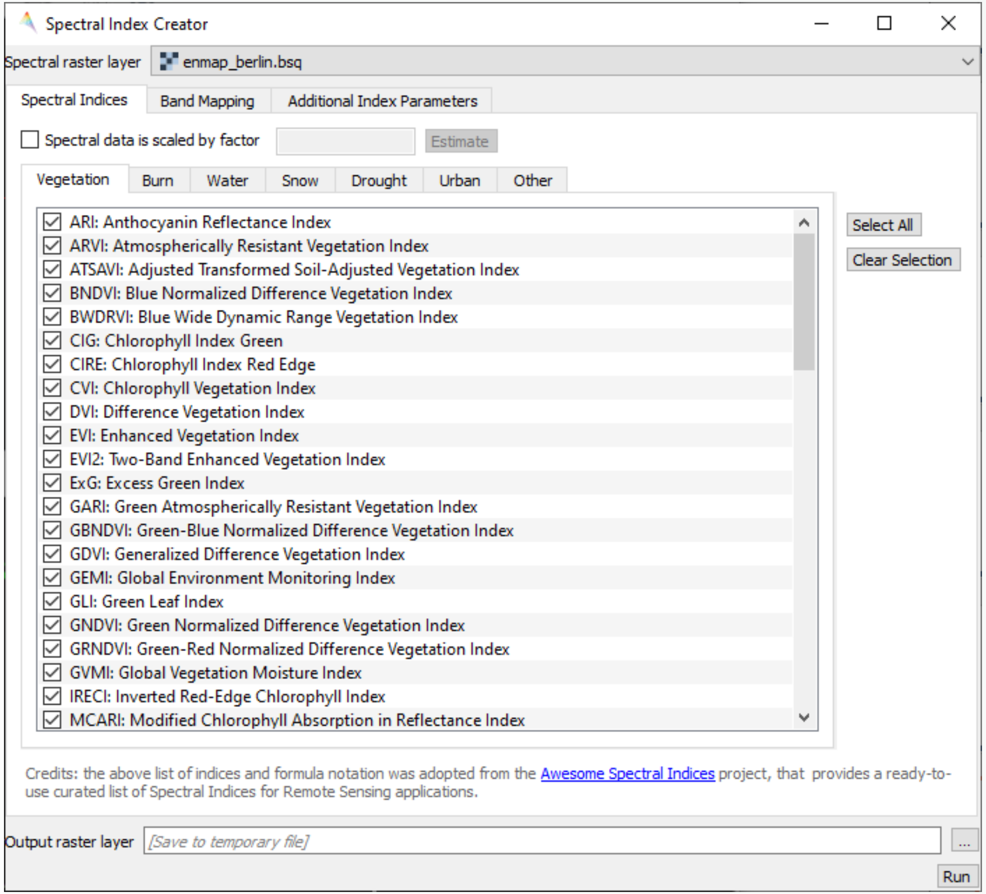


Basic Tools – Bivariate Color Renderer

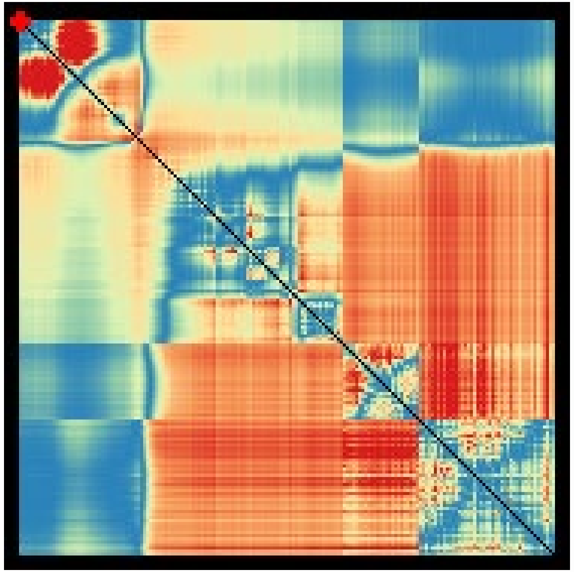


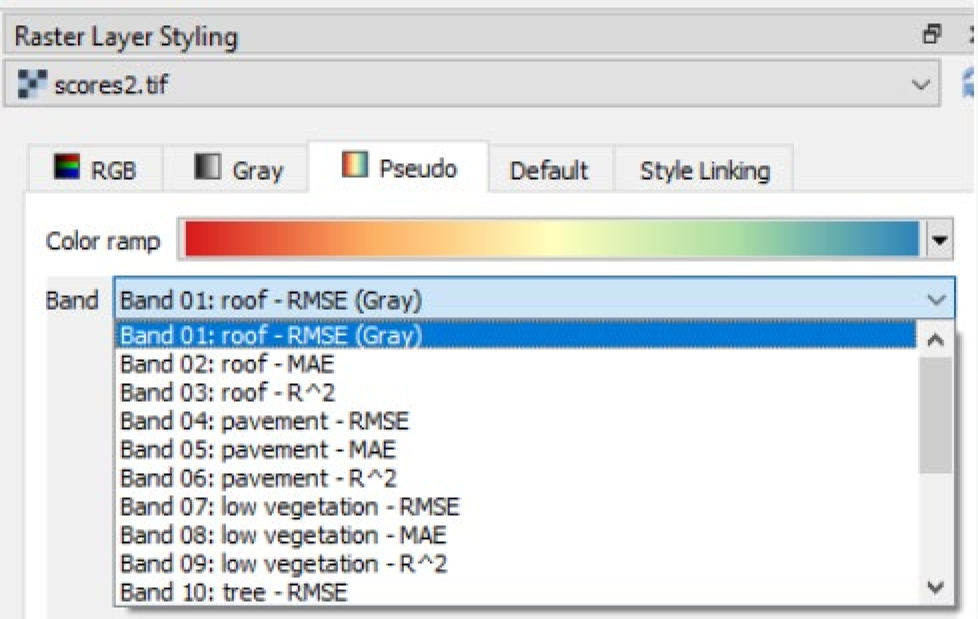
Spectral Tools – Spectral Index Creator

- Extensive index list taken from *Awesome Spectral Indices* project.



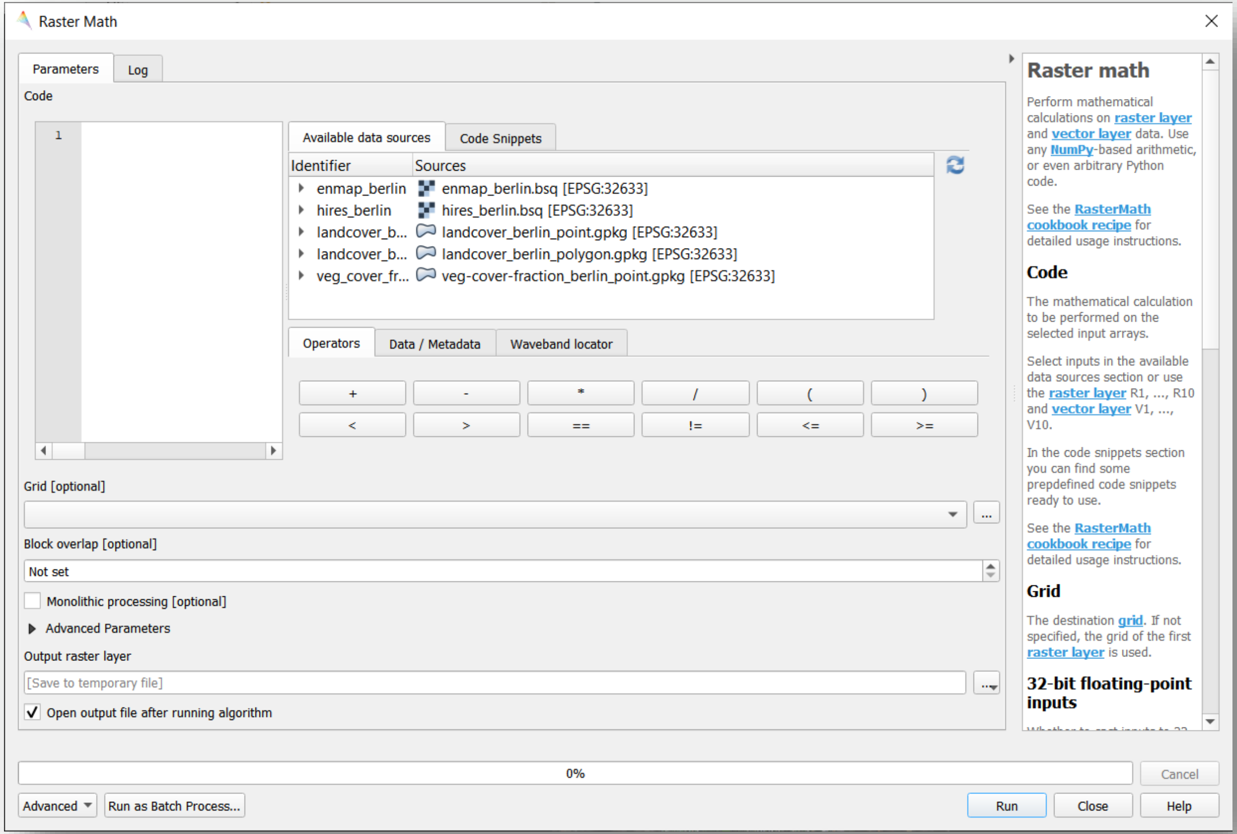
Spectral Tools – Spectral Index Optimizer



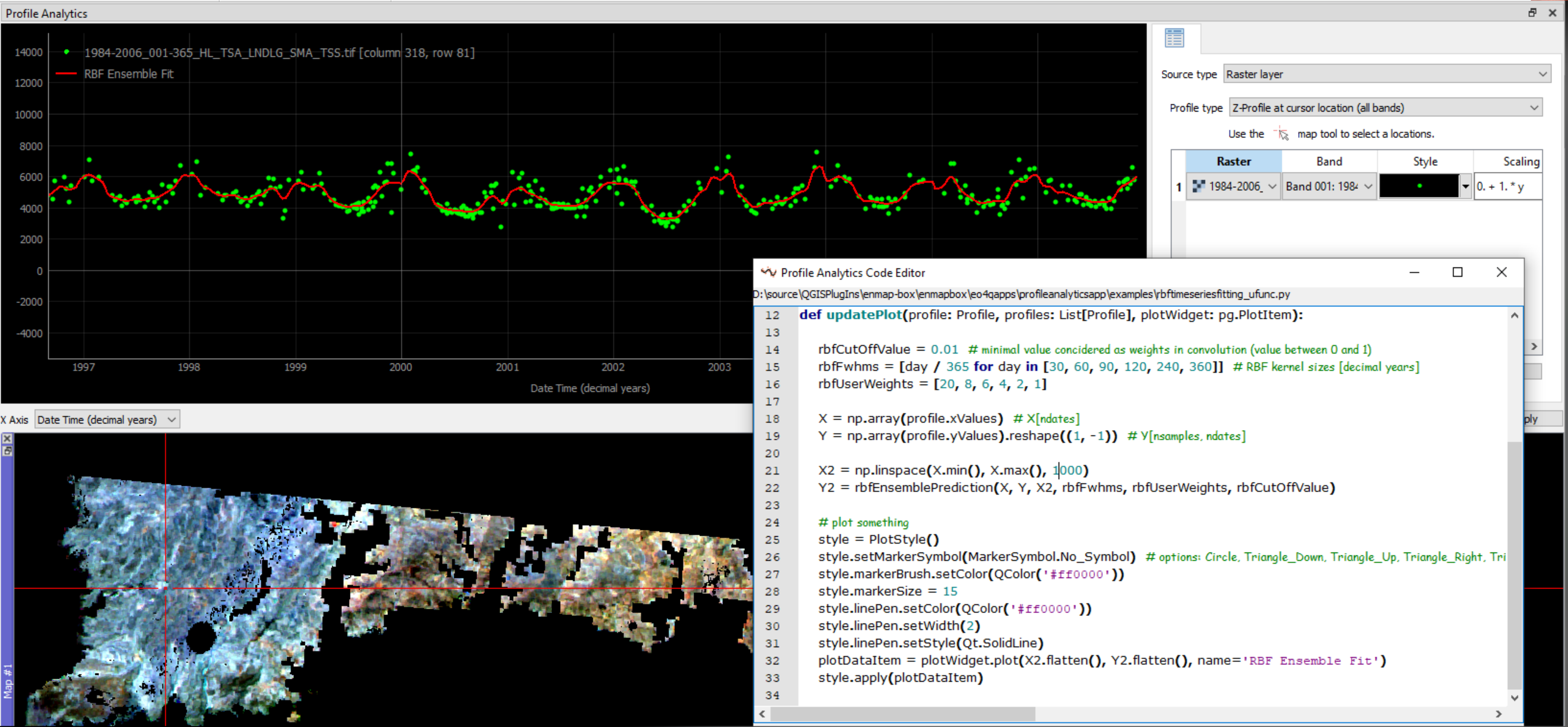


Raster Tools – Raster Math

- Easy numpy scripting with data IO fully handled



Raster Tools – Profile Analytics (PA) App



Spectral Library Tools

Snap to pixel center

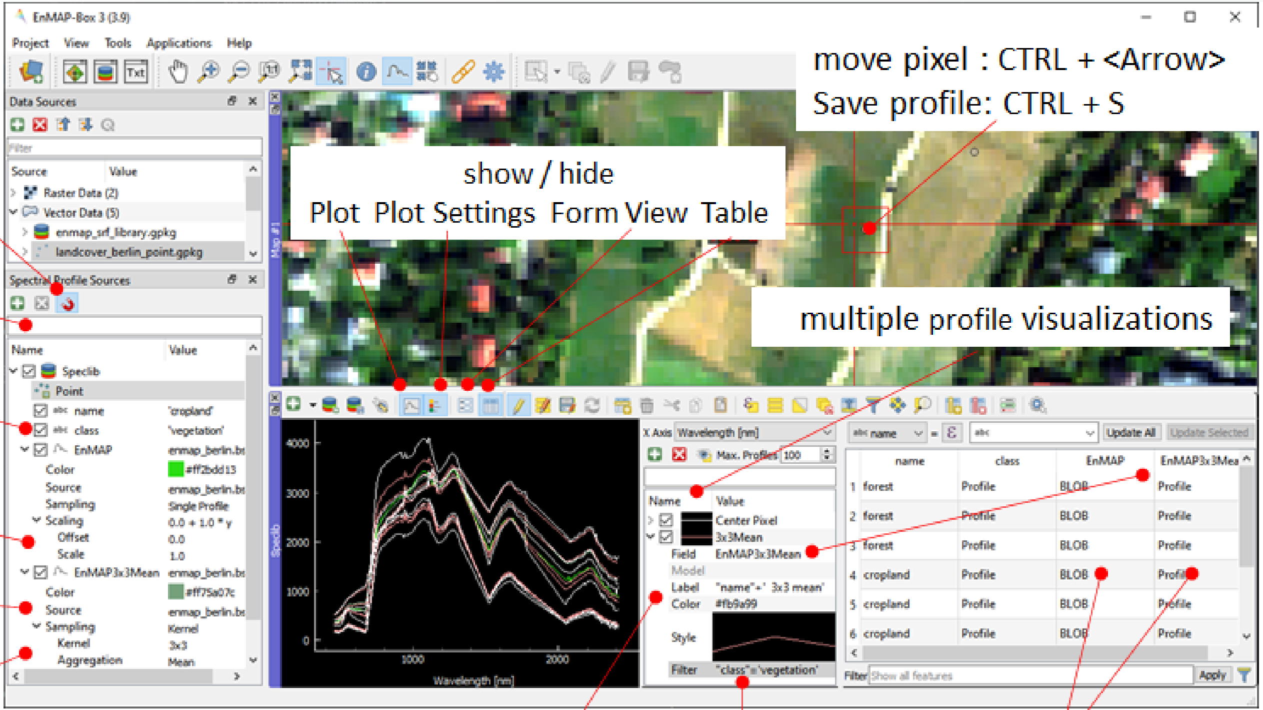
search settings

define values for each field

scale profiles

overlay color

sampling



Enhanced Profile Source Panel

Enhanced Plot Settings

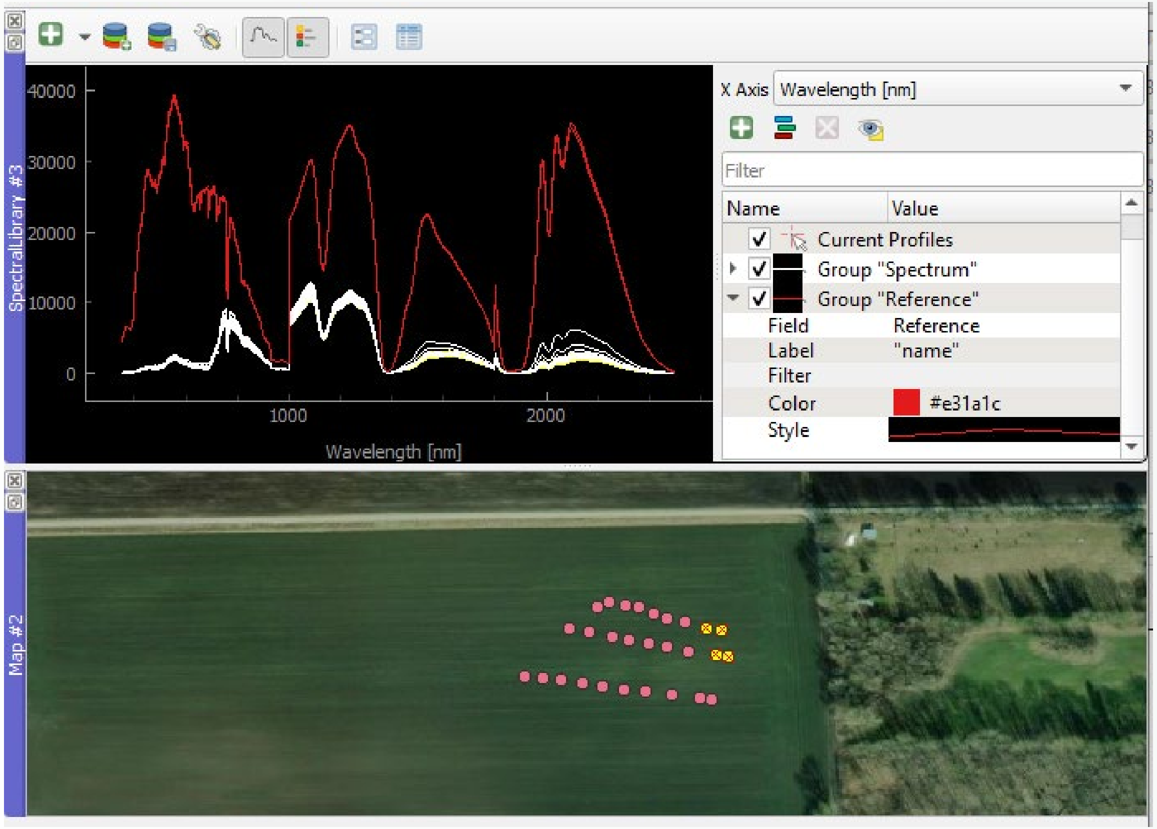
Individual / generated labels and colors

filter profile by attributes

multiple profile fields

Spectral Library Tools – Data Format and Import

- Spectral Profiles in Geopackage Format
- Flexible Attributes stored with Spectra: location, white reference…



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EnSoMAP

also EnGeoMAP for mineral mapping

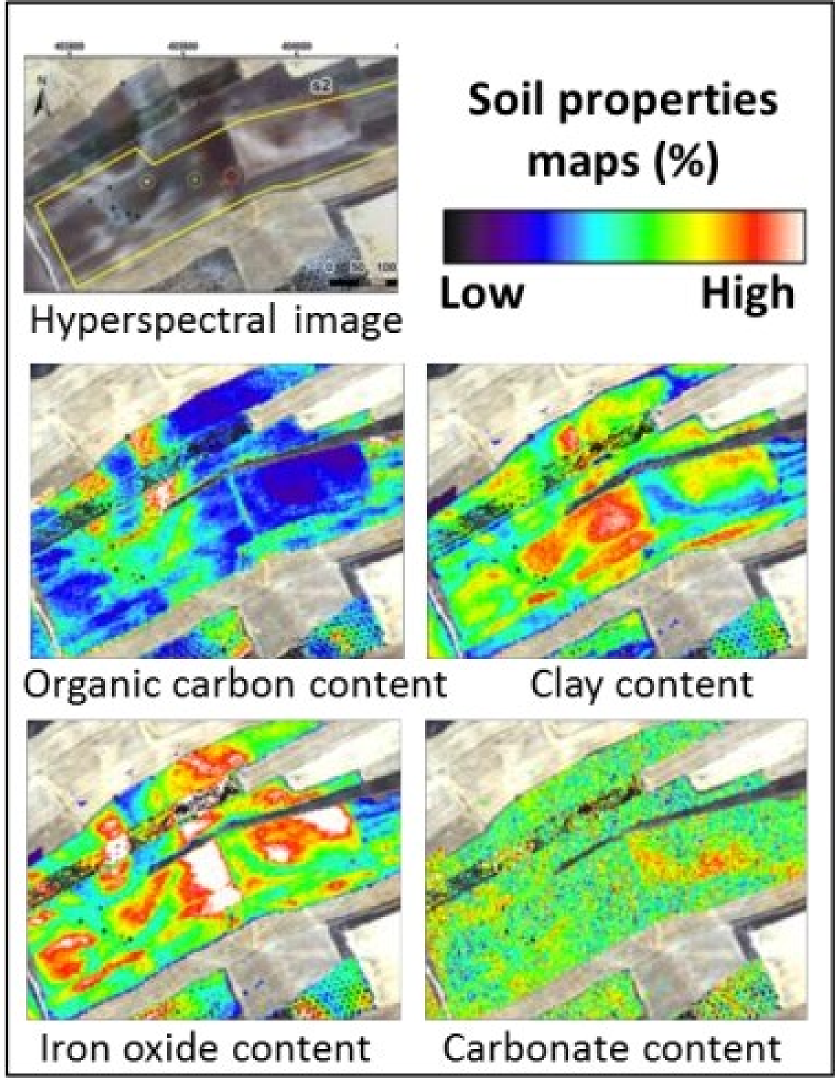
Input:
Hyperspectral Image
Soil data (for quantitative analyses)

A. Bare soil pixels selection
- Preprocessing
- Water Mask
- Green & Dry Vegetation Mask

B. Soil properties mapping
- Soil parameter selection
- Soil algorithm selection

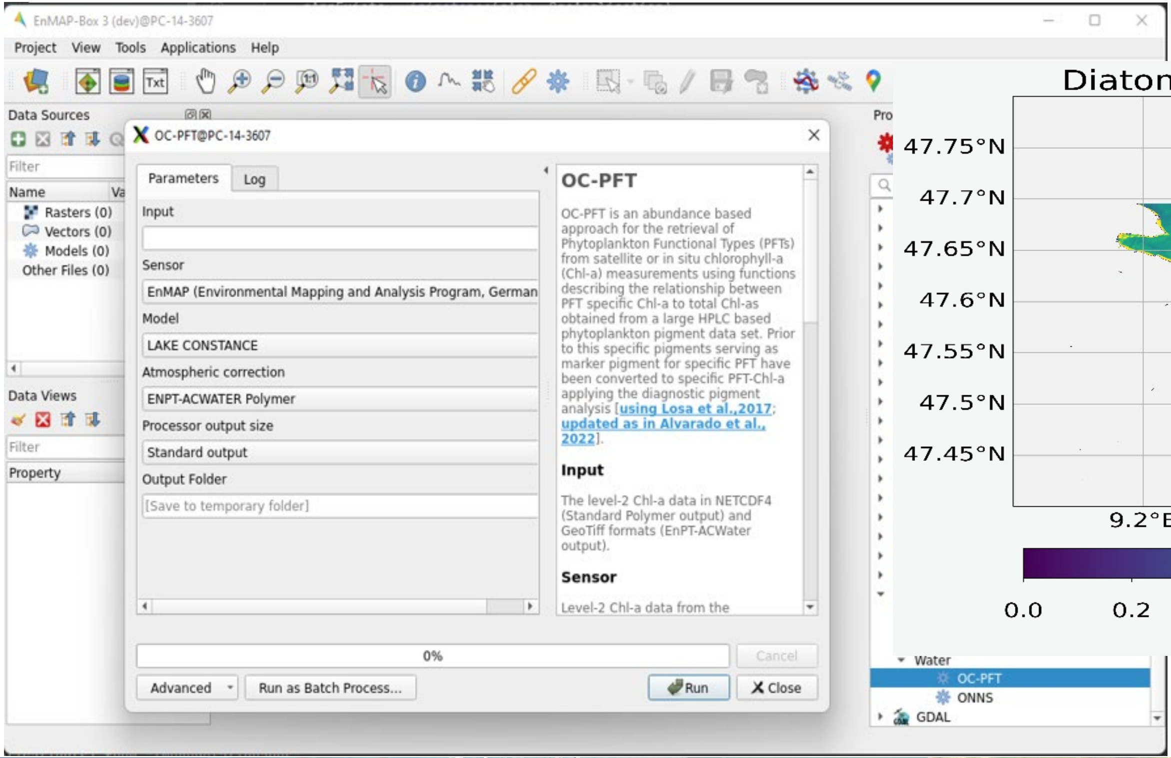
C. Quantitative analyses
- Calibrate with field data (EnSoCal)
- Quantitative Validation (EnSoVal)
- Extract SSL(EnSoLib)

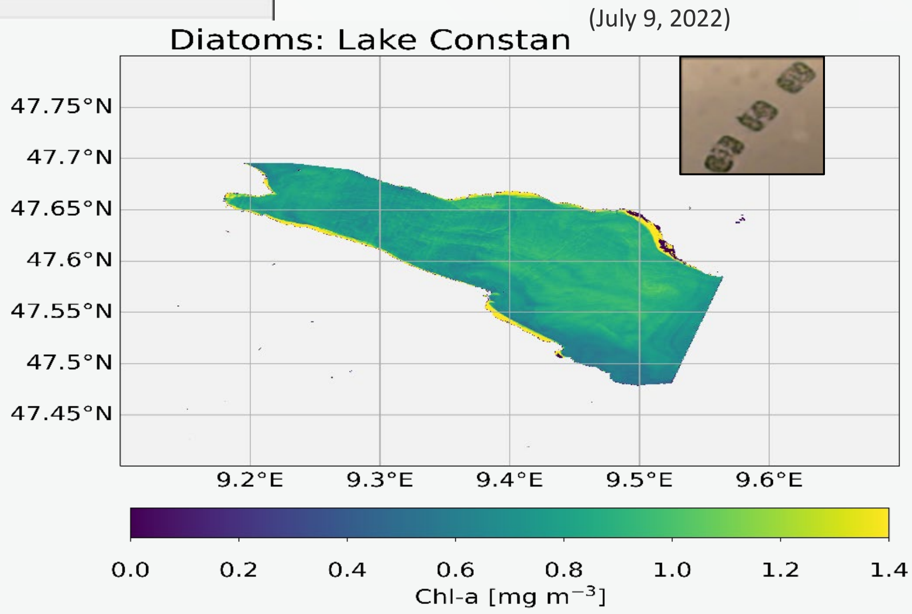
Output:
Bare Soil Map
Soil properties Maps
Prediction accuracy Map
Quantitative Soil Maps



Water applications

- OC-PFT: Retrieval of Phytoplankton Functional Types.





Agri Tools

Agriculturally relevant information can be derived from hyperspectral data in the EnMAP-Box via diverse methods:

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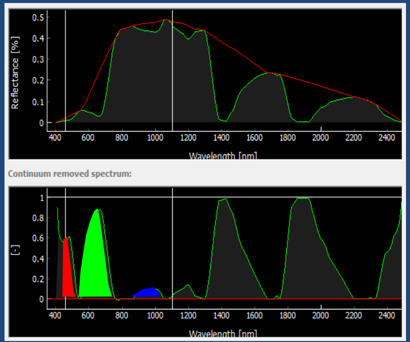
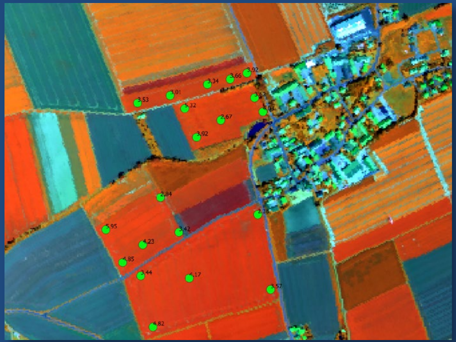
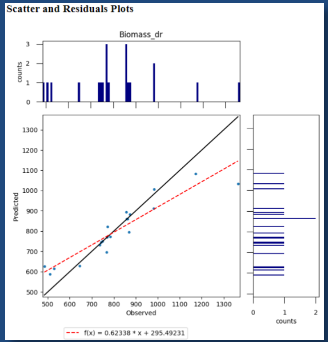
Parametric Methods (e.g. Indices, ASI, iREIP)

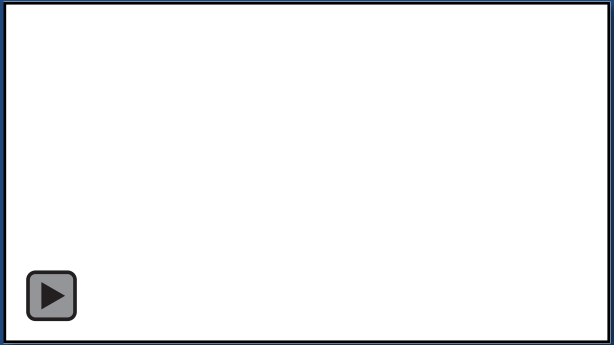


Non-Parametric Methods (e.g. Regression Workflow)

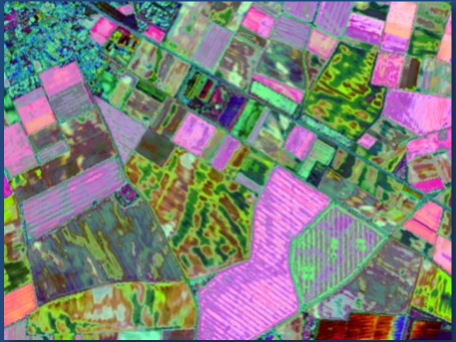


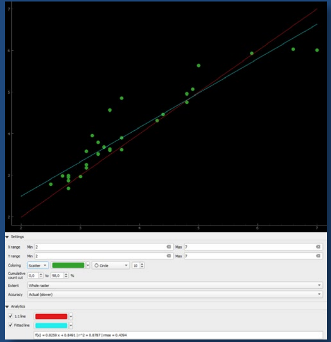


Physically-Based Methods (e.g. IVVRM, PWR, Invert LUT)



Hybrid Methods (e.g. ANN Vegetation Processor)





EnMAP-Box – Programming Interface

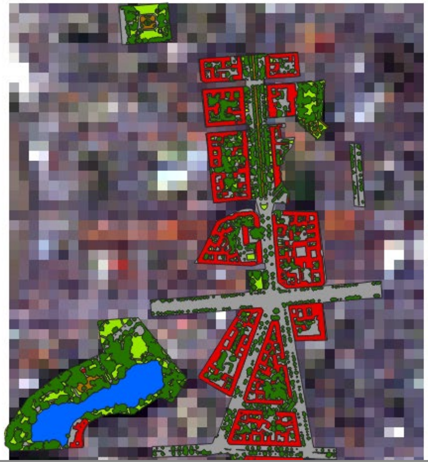
Clip a raster with a vector

Clip a raster with the extent from a vector.

```
import enmapboxtestdata
from hubdc.core import *

rasterDataset = openRasterDataset(filename=enmapboxtestdata.enmap)
vectorDataset = openVectorDataset(filename=enmapboxtestdata.landcover_polygons)
grid = rasterDataset.grid().clip(extent=vectorDataset.extent())
clipped = rasterDataset.translate(grid=grid, filename='raster.tif', driver=GTiffDriver())
```

Note that the result raster grid is snapped to the original raster grid to prevent subpixel shifts. Because of this, some vector geometries may slightly lap over the grid borders.



EnMAP-Box Publication

- Jakimow B, A Janz, F Thiel, A Okujeni, P Hostert, S van der Linden (2023). EnMAP-Box: Imaging Spectroscopy in QGIS. SoftwareX, *in review*.

Manuscript File

Click here to view linked References

EnMAP-Box: Imaging Spectroscopy in QGIS

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Abstract

Satellite missions like EnMAP and PRISMA generate raster images that describe the Earth's environment with hyperspectral resolution. Such imag-

Contact

- For detailed information, installation, application tutorials have a look at https://enmap-box.readthedocs.io/en/latest/

- Or write us: enmapbox@enmap.org