

EnMAP-Box 3

Free and Open Source Processing of Hyperspectral Imagery within QGIS Plugin

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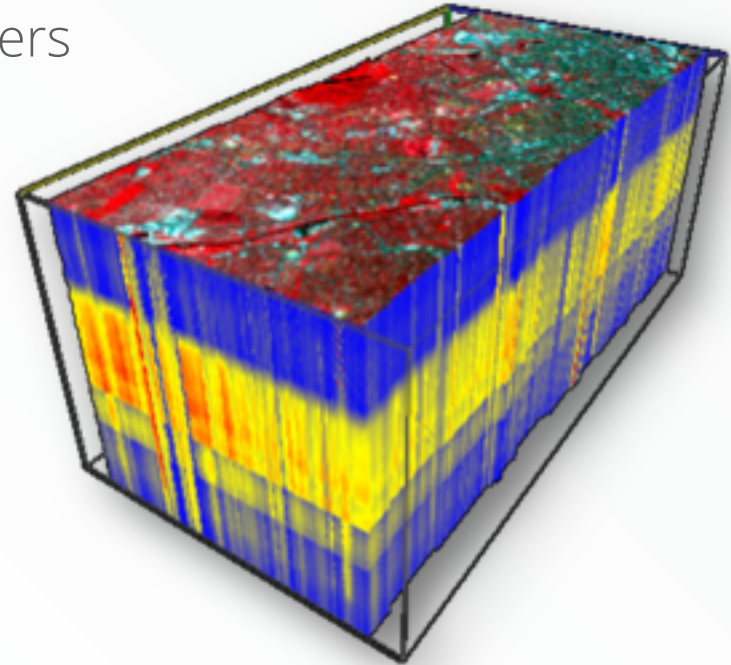


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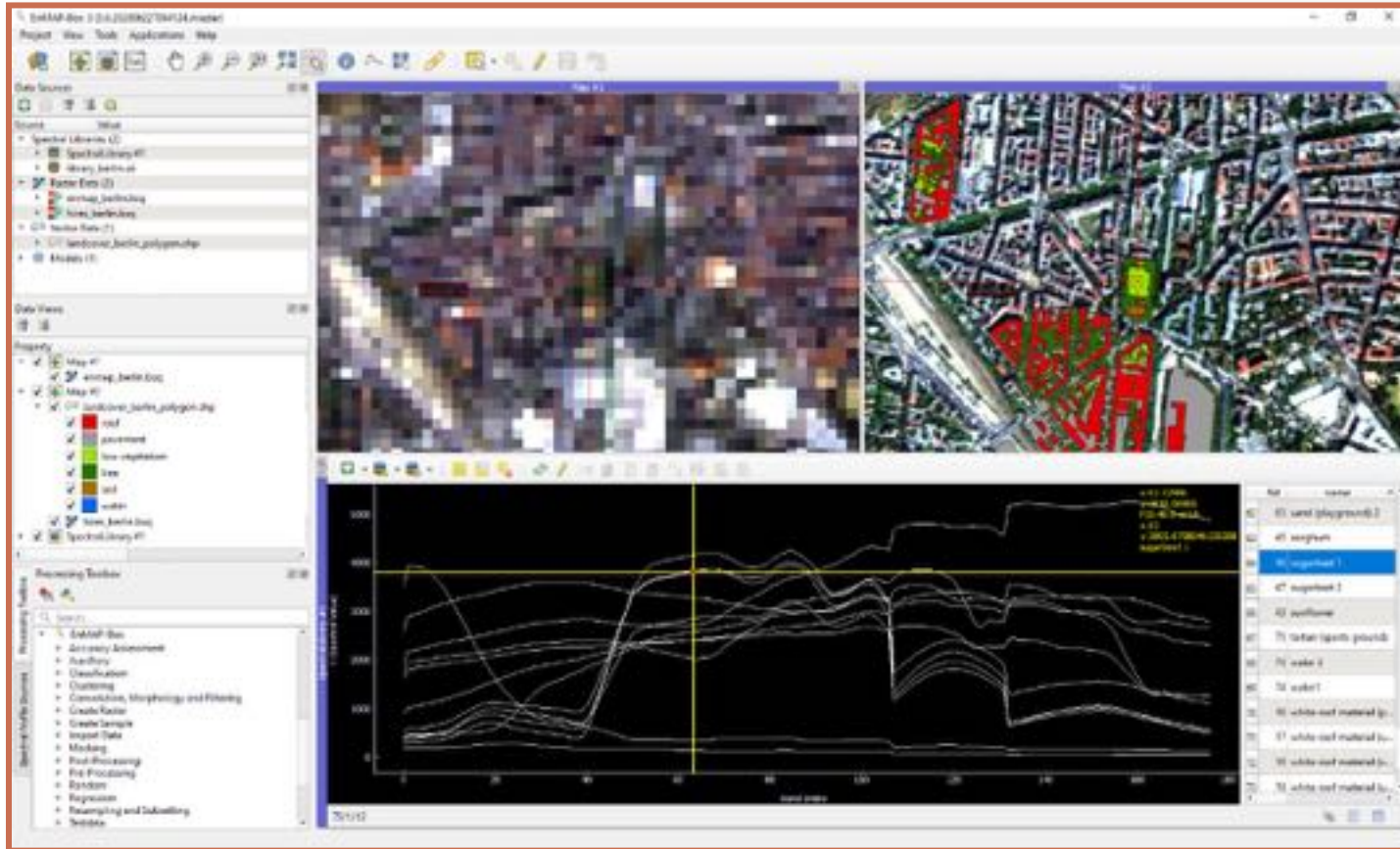


EnMAP-Box – Motivation and Aims

- ❖ 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

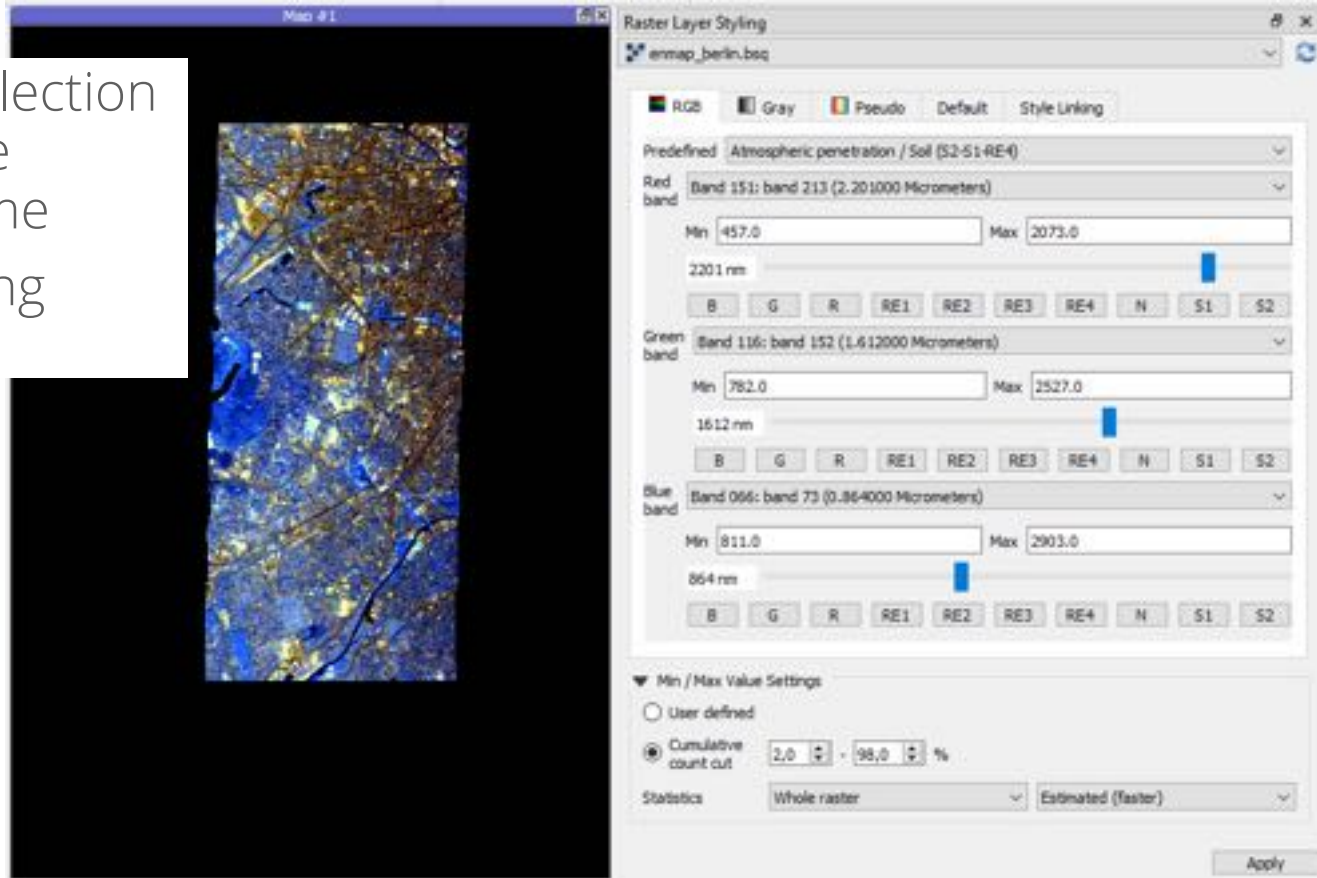


EnMAP-Box – Multiple Views



EnMAP-Box – Raster Layer Styling

- ❖ Easy band selection along favorite sensor scheme
- ❖ Spectral linking



The screenshot displays the 'Raster Layer Styling' dialog box in a Mac OS environment. The dialog is titled 'enmap_berlin.boq'. It features three main sections for band styling: Red, Green, and Blue. Each section includes a 'Predefined' dropdown menu, a 'Band' selection dropdown, and a range selector with 'Min' and 'Max' input fields and a slider. The Red band is configured with 'Band 151: band 213 (2.201000 Micrometers)', a range from 457.0 to 2073.0, and a slider at 2201 nm. The Green band is configured with 'Band 116: band 152 (1.612000 Micrometers)', a range from 782.0 to 2527.0, and a slider at 1612 nm. The Blue band is configured with 'Band 096: band 73 (0.864000 Micrometers)', a range from 811.0 to 2903.0, and a slider at 864 nm. Below these sections, there are 'Min / Max Value Settings' with radio buttons for 'User defined' and 'Cumulative count cut' (selected), and a 'Statistics' dropdown menu. An 'Apply' button is located at the bottom right of the dialog.

EnMAP-Box – Advanced Spectral Library Tools

EnMAP-Box 3 (master)

Project View Tools Applications Help

Data Sources

Filter

Name	Value
> Rasters (1)	
> Vectors (1)	

Data Views

Filter

Property

- Map #1
 - MySpecLib.gpkg
 - Esri Satellite
 - MySpecLib.gpkg
 - MySpecLib.gpkg

Map #1

MySpecLib.gpkg

Wavelength [nm]

X Axis Wavelength [nm]

Filter

Name	Value
> General Settings	
<input checked="" type="checkbox"/> Current Profiles	
> Group "Spectrum"	
Field	Spectrum
Label	"name"
Filter	
Color	#ffffff
Style	
> Group "Reference"	

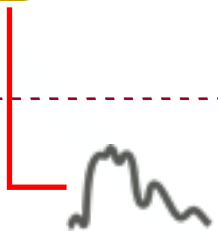
	name	Reference	Spectrum
20	ww00144.asd	Profile	Profile
21	ww00149.asd	Profile	Profile
22	ww00154.asd	Profile	Profile
23	ww00159.asd	Profile	Profile
24	ww00164.asd	Profile	Profile
25	ww00169.asd	Profile	Profile
26	ww00174.asd	Profile	Profile

Filter Show all features



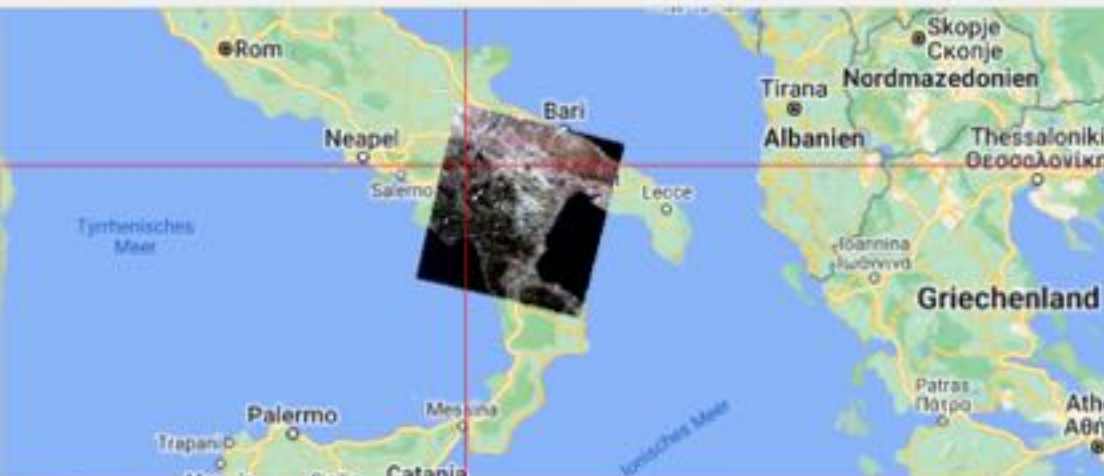
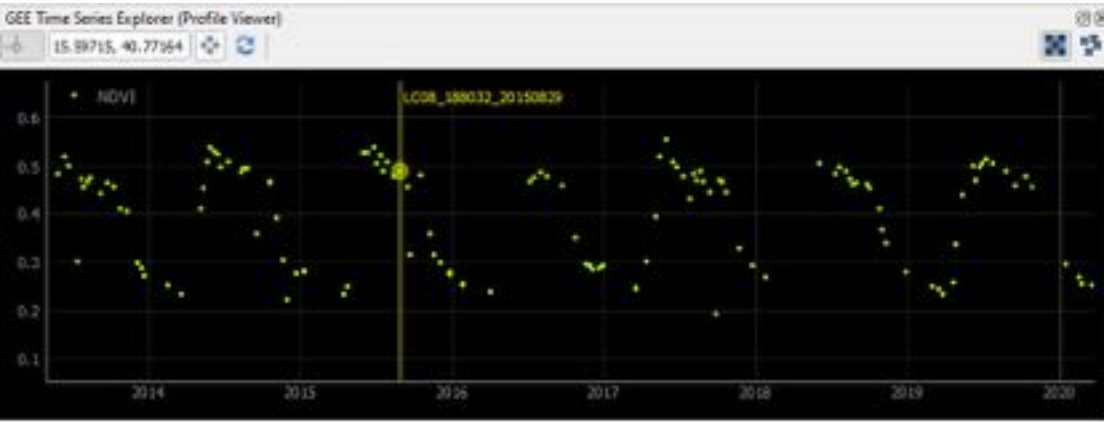
Profile Processing

Raster Processing





EnMAP-Box – GEE Time Series Explorer



Google Earth Engine

GEE Time Series Explorer

Landsat MODIS Sentinel HSI Custom

Landsat 9 Surface Reflectance 2021 - Present

Landsat 8 Surface Reflectance 2013 - Present

Landsat 7 Surface Reflectance 1999 - Present

Landsat 5 Surface Reflectance 1984 - 2012

Interactive Visualization of Vegetation Reflectance Models

Sensor Type

Select sensor

400-2500 nm @ 1nm

bands: **2101**

Accumulative Plotting

Select Leaf Model

Prospect 3 Prospect 5b

Prospect 4 Prospect D

Prospect 5 Prospect Pro

Select Canopy Model

Leaf Model Only

4Sai

Sai 2M

Infam

Select Background

Use default soil spectrum

Load background spectrum

Find background spectrum

Brightness Factor:

[How to use this tool](#)

Leaf Model Parameters

Structure Parameter (N) [-]

Chlorophyll A + B (Cab) [$\mu\text{g}/\text{cm}^2$]

Water Content (Cw) [cm]

Dry Matter (Cm) [g/cm^2]

Carotenoids (Ccx) [$\mu\text{g}/\text{cm}^2$]

Brown Pigments (Cbrown) [-]

Anthocyanins (Canth) [$\mu\text{g}/\text{cm}^2$]

Proteins (Cp) [g/cm^2]

Carbon-based constit. (CBC) [g/cm^2]

Canopy Model Parameters

Leaf Area Index (LAI) [m^2/m^2]

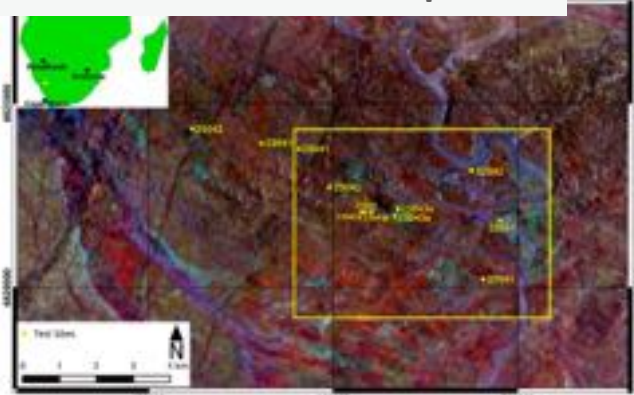
Ellipsoidal

Leaf Angle [deg]

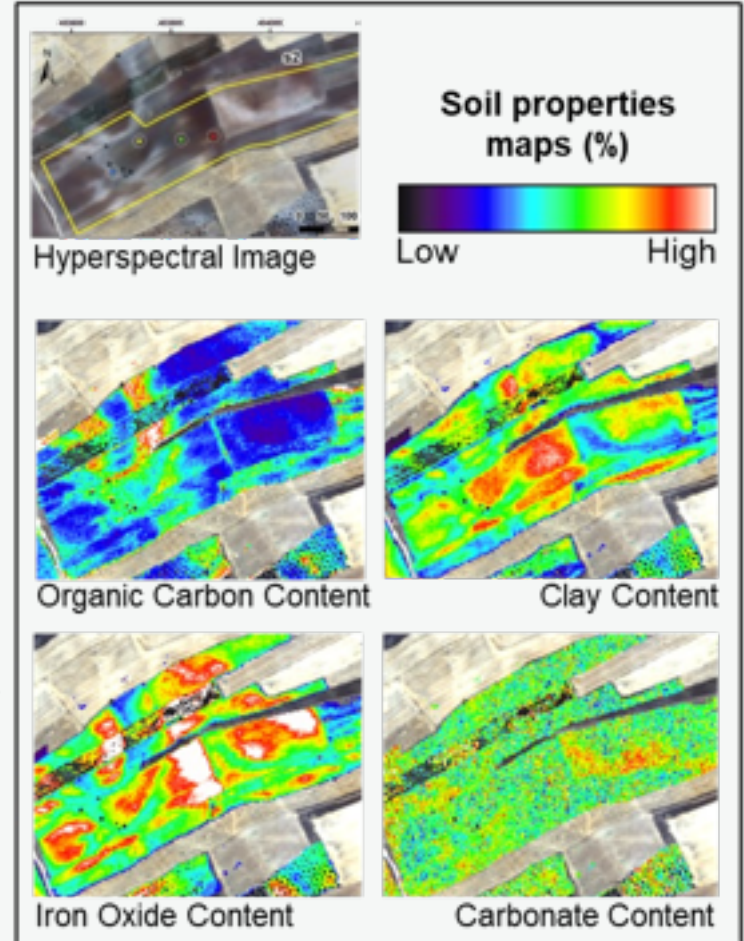
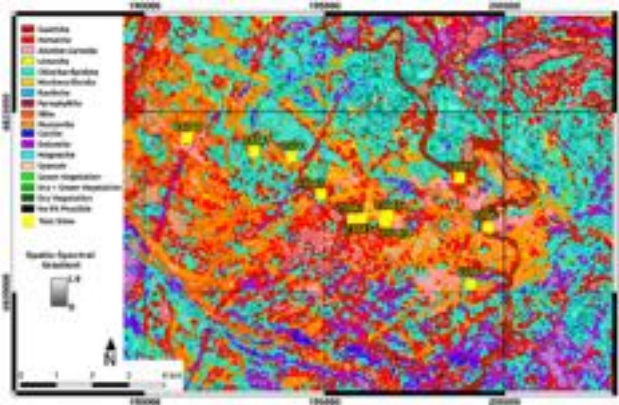
Hot Spot Size Parameter [-]

EnMAP-Box – EnGeoMAP & EnSoMAP

Simulated EnMAP Composite



Mineral Map Produced from EnMAP Scene





EnMAP-Box – Conclusions

- ❖ Free and open source QGIS plugin
- ❖ Easy import of various hyper- and multispectral data sources
- ❖ User-friendly visualization of images and spectra
- ❖ New spectral library approaches
- ❖ Manifold user-friendly machine learning applications
- ❖ Customized applications for selected fields
- ❖ Comprehensive online documentation, now including videos



Contact

- ❖ For detailed information, installation, application tutorials have a look at <https://enmap-box.readthedocs.io/en/latest/>
- ❖ Or write us: enmapbox@enmap.org

