

Euro Data Cube Services

Earth Observation Information Factory

- **one-stop-shop for EO** - you can find all important EO and derived data products at one place
- **analyse** an event or phenomena from different perspectives
- provision of multiple data sources
- **compare** and **correlate** several variables at the same time
- **customize** your data pipeline
- try it out for **free**
- kick-start your **Earth Observation Application!**

Euro Data Cube in a nutshell is a combination of several services:

Global Archives of Analysis Ready Data

Open satellite missions - Sentinel, Landsat, MODIS, etc.

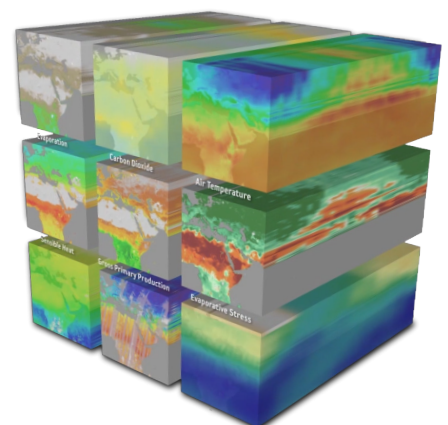
Commercial VHR datasets - PlanetScope, Pléiades, SPOT, etc.

Earth System Data Cube

ESA and Copernicus Climate Change Initiative

User contributed content

Data fusion in order to combine various datasets



Access and Analysis

Sentinel Hub - Cloud API to most important EO datasets, perfect for ad-hoc access, interactive exploration and integration in 3rd party applications

Batch Processing - heavy-duty processing tasks for large-scale analysis and machine learning

xcube - perfectly customizable analysis and processing based on xarray technology

Storage and Distribution

geoDB for geospatial vector data and Sentinel Hub for raster data

Control the distribution to specific users or user groups

Exploitation

EOxHub Workspace – managed compute and storage environment to run Jupyter Notebooks and to host own applications

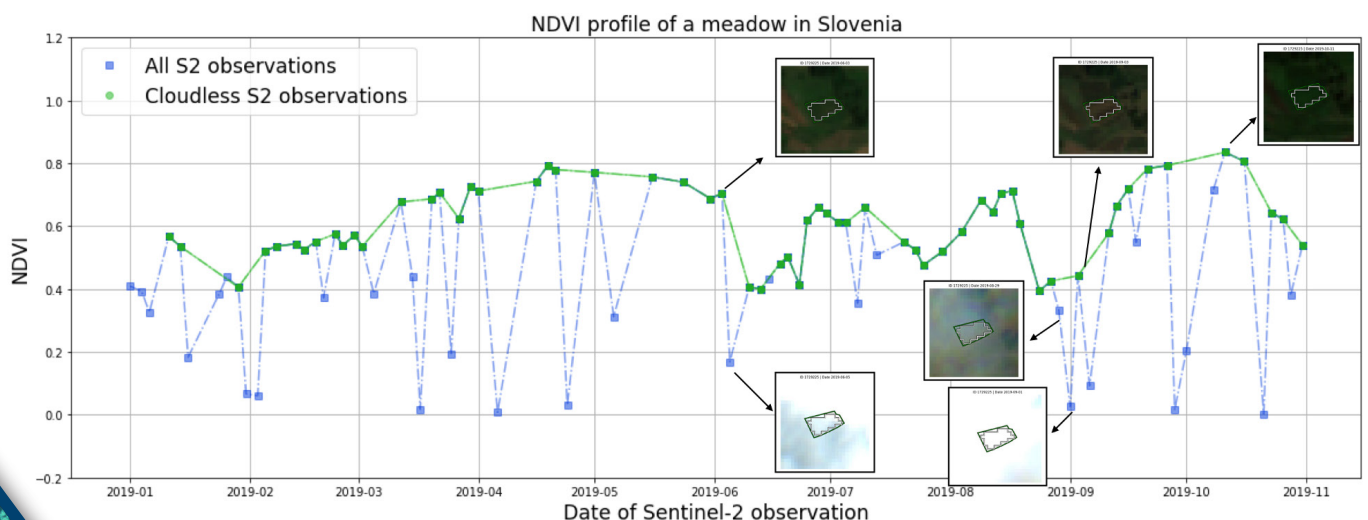
Collaboration

Marketplace for free or revenue-generating options to share data, applications and algorithms

GitHub repositories for public contributions of code and algorithms



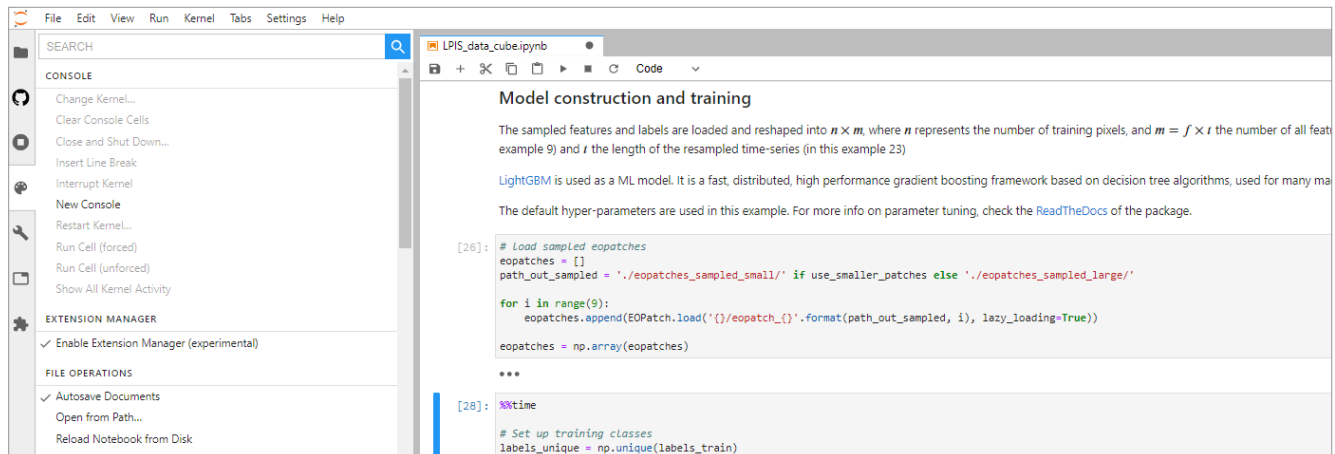
Example of automated land cover prediction



A comparison of the original unmasked and masked NDVI profile of a meadow in Slovenia which shows that cloudy observations are successfully identified with s2cloudless. Inserted true-colour visualisations of this meadow and its surrounding are added for illustration purposes.

Environment for **Everyone**

- **Data Scientists** and **Machine Learning experts** - analyse data using **xcube** and establish ML workflows using scikit-learn, OTB, eo-learn and other frameworks
- Remote Sensing scientists – **EO Browser**, **QGIS plugin** and **xcube** visualization
- Application developers - integrate **Sentinel Hub API** directly in web applications, avoid all the hassle related to EO data storage and maintenance
- Data providers - store data on own or platform's object storage and provide full **EDC capabilities** to a selected group of users, maintaining full control over the data
- **Algorithm providers** - share the knowledge in a set of custom scripts or Python code base



The screenshot shows a JupyterLab environment with a file explorer on the left, a console, and a code editor. The code editor displays a Python script titled "Model construction and training". The script includes comments explaining the process of loading sampled eopatches, resampling them, and training a LightGBM model. The code is as follows:

```
[26]: # Load sampled eopatches
eopatches = []
path_out_sampled = './eopatches_sampled_small/' if use_smaller_patches else './eopatches_sampled_large/'

for i in range(9):
    eopatches.append(EOPatch.load('{}eopatch_{}'.format(path_out_sampled, i), lazy_loading=True))

eopatches = np.array(eopatches)

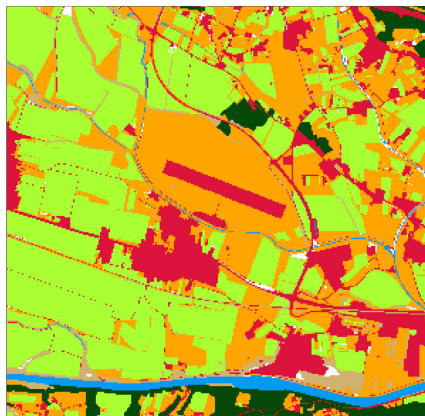
***

[28]: %time
# Set up training classes
labels_unique = np.unique(labels_train)
```

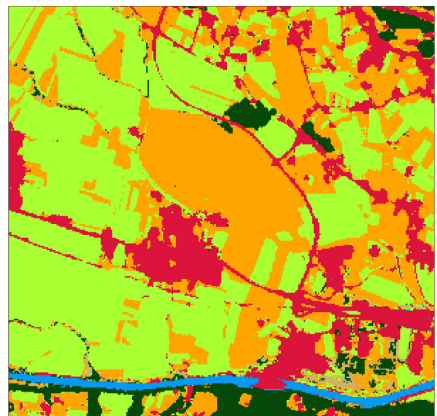
Sentinel-2 Image



Ground Truth



Prediction



Complete ML workflow, from labels to predictions such as above, can be easily modelled and executed in JupyterLab.

Benefits for the Users

- Operational, fully managed and self-serving services tailored for **Earth Observation** - start using immediately and without worries about scaling and maintenance
- **Free options** - free trial of the services and free R&D accounts
- **Pay-per-use** - user packages supporting initial small-scale start-up as well as quick growth
- **User support** - EDC staff from EO and IT backgrounds with remote sensing background ready to assist you with special requests, documented examples and code snippets via forums and documentation

Insight in the Offering

Sentinel Hub - Cloud API

instant access to any observation

user-configured compositing, mosaicking, reprojection, rescaling

output optimized for visualization (image), analysis (pixel values) or statistical processing (JSON)

Batch Processing

configurable mosaicking and compositing rules

optimized grids for follow-up machine learning workflows

optimized scheduling and processing for lower costs

xcube

fully customisable data pipeline to generate tailored cubes

integration with 3rd party Python libraries

integration with feature data stored in geoDB

publishing and visualisation of user cubes

Jointly analyse EO and non-EO data, integrating gridded with non-gridded data, thus breaking the limits of classical data analysis and greatly facilitating innovative applications

geoDB

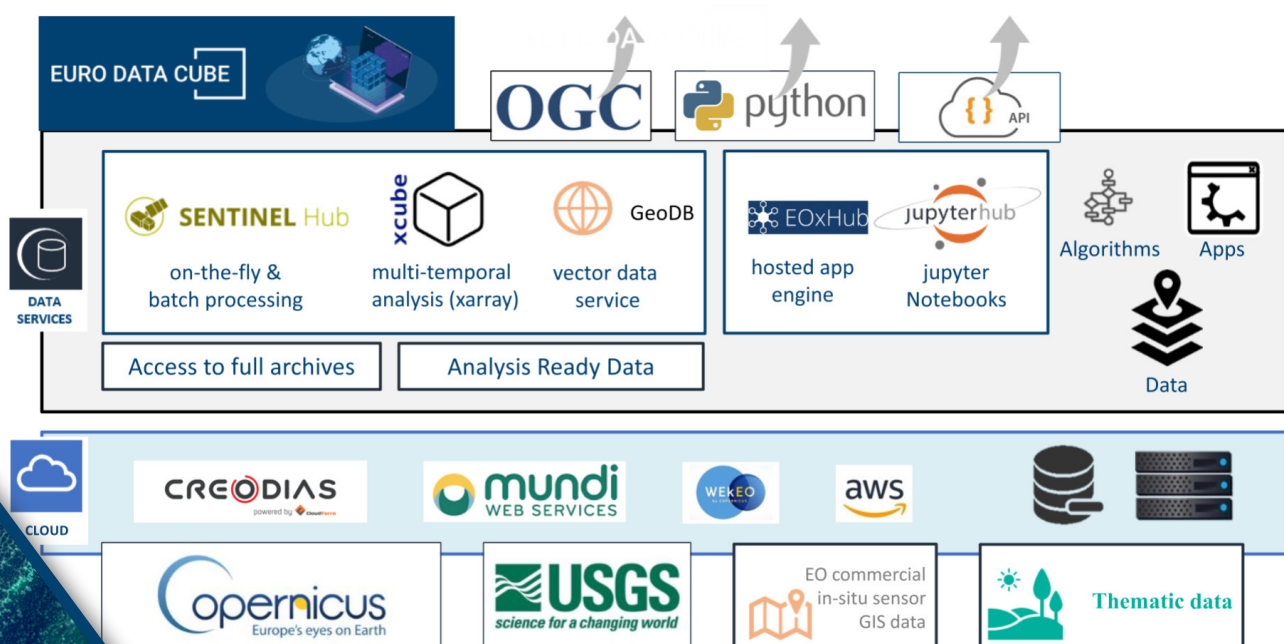
fully-featured PostgreSQL database

scalable for small and large datasets

several readily available datasets

EOxHub Workspace

Kubernetes-powered execution of dockerised applications



Data Offering

- Sentinel-1 GRD
- Sentinel-2 L1C and L2A
- Sentinel-3 OLCI and SLSTR, Level 1
- Sentinel-5P Level 2
- Landsat 8
- MODIS
- Airbus SPOT and Pléiades
- PlanetScope
- Digital Elevation Model
- ESA Climate Change Initiative
- Copernicus Climate Change Service
- Copernicus Marine Service
- Copernicus Land Use Monitoring Service
- Copernicus Atmosphere Monitoring Service
- Earth System Data Cube
- Need more? Contact us or Bring Your Own Data!
And check for updates as we are continuously expanding the data offer

In most cases the full archives are available, for other the coverage is available on-demand

Need more?
**Contact us or
Bring Your Own
Data!**



Pricing Schedule

Sentinel Hub

PACKAGE	PRICE	LIMITS				NOTES
		Processing units ⁽¹⁾ per month	Processing units per minute	Requests per month	Requests per minute	
Free options						
30-day free trial	/	30 000	300	30 000	300	(2)
Subscription + pay-as-you-go options	Monthly fee	Monthly processing units covered within basic price	Processing units per minute	Requests per month	Requests per minute	
Exploration - non-commercial/research	30 EUR/ month 300 EUR/ year	30 000	300	100 000	300	(2, 3)
Basic	100 EUR/month 999 EUR/year	70 000	500	350 000	500	(3)
Enterprise S	500 EUR/ month 5 000 EUR / year	400 000	1 000	N/A	600	(3)
Enterprise L	1 000 EUR/month 10 000 EUR/year	1 million	2 000	N/A	1 200	(3)
Large scale processing	Use Sentinel Hub Batch Processing Discounts starting with factor of 3 are possible compared to On-the-fly Sentinel Hub.					
Pre-paid processing units	Price per 1000 processing units	Processing units per month	Processing units per minute	Requests per month	Requests per minute	
40 000 - 400 000 processing units	2.50 EUR	/	1 000	N/A	300	(4)
400 001 processing units and more	1.50 EUR	/	1 000	N/A	300	(4)

Notes:

- (1) Definition of processing unit: https://docs.sentinel-hub.com/api/latest/#/API/processing_unit
- (2) No commercial activity is permitted
- (3) Additional requests can be purchased at 1.5 EUR per 1000 processing units (there is no automatic surcharge)
- (4) Pre-paid processing units expire after 24 months

xcube

xcube processing units (XCPUs) are the currency for consuming xcube services. For example, the generation of a data cube with 512x512x1 pixels consumes one XCPU. For xcube generation service, no Sentinel Hub subscription is required.

PACKAGE	PRICE	SERVICE	NOTES
Description	Monthly fee	Included processing units per month	
Free	0 EUR		Available once per user for one initial month
Basic	23 EUR	20 000 XCPU per month	
Medium	100 EUR	100 000 XCPU per month	
Large	500 EUR	450 000 XCPU per month	

geoDB

PACKAGE	PRICE per month	NOTES
Managed geoDB hosting		
Small	80 EUR	100 MB storage
Medium	500 EUR	10 GB storage
Large	2 000 EUR	100 GB storage
geoDB access		
per user	80 EUR	

Commercial Data

PACKAGE	MIN ORDER
PlanetScope	1 hectare
Airbus Pléiades	0.25 km ²
Airbus SPOT	2.5 km ²
Maxar WorldView	5 km ²

EOxHub Workspace

PLAN NAME	CPU	MEMORY	OUTBOUND DATA TRANSFER	STORAGE	PRICE (MONTHLY)
EOxHub - Promotional Plan limited to 3 months	shared	up to 4 GB	1 GB	5 GB SSD	0 EUR
EOxHub - Standard Plan <ul style="list-style-type: none">• burstable by distributing work on up to 2 additional worker nodes (each 2 CPU/8 GB Mem)• fair use policy on guaranteed resources (2 CPU/8 GB Mem) calculated on an hourly average of 1 min probes	up to 6	up to 24 GB	6 GB	30 GB SSD	99 EUR
EOxHub - Standard XL Plan <ul style="list-style-type: none">• burstable by distributing work on up to 12 additional worker nodes (each 2 CPU/8 GB Mem)• fair use policy on guaranteed resources (12 CPU/48 GB Mem) calculated on an hourly average of 1 min probes	up to 36	up to 144 GB	36 GB	180 GB SSD	599 EUR
EOxHub - GPU Plan <ul style="list-style-type: none">• includes GPU support with up to 12 GB CPU Mem• fair use policy on guaranteed resources (4 CPU/24 GB Mem/6 GB GPU Mem) calculated on an hourly average of 1 min probes	up to 7	up to 56 GB	36 GB	180 GB SSD	599 EUR

Custom plans available - please contact us if you have the need for a different configuration with e.g. additional SSD storage (0.12/GB/month) or object storage (0.05/GB/month).

<https://eurodatacube.com/marketplace/infra/eoxhub>

EOxHub Managed EO Data

PACKAGE	PRICE	NOTES
Pay-per-use options:		
Managed EO Data	0.05 EUR per GB/month 0.1 EUR per GB outbound network traffic	<ul style="list-style-type: none">• object storage with high durability, availability, and performance• client-side data preview and processing capabilities for COGs• optional:<ul style="list-style-type: none">• automatic data registration with EDC services (BYOD)• download/sync capabilities for offline usage

Cloud API for Satellite Imagery



Get Started

Experience a cloud-based data API that removes the complexity of processing large volumes of satellite data. Instantly access Sentinel, Landsat, and other Earth observation imagery – archives of more than 10 PB of data, both historic and the latest acquisitions, increasing at a rate of about 300 TB every month. Scale your system globally with an intuitive and user-friendly interface, without any hassle.

Sentinel Playground and EO Browser are freely available online. For advanced services request a trial at www.sentinel-hub.com/trial

Global Archive of Earth Observation Data

Sentinels (1 SAR, 2 MSI, 3 OLCI and SLSTR, 5P), Landsat (8, ESA archive of 5 and 7), ENVISAT, MODIS, PlanetScope, Pléiades, SPOT and others.

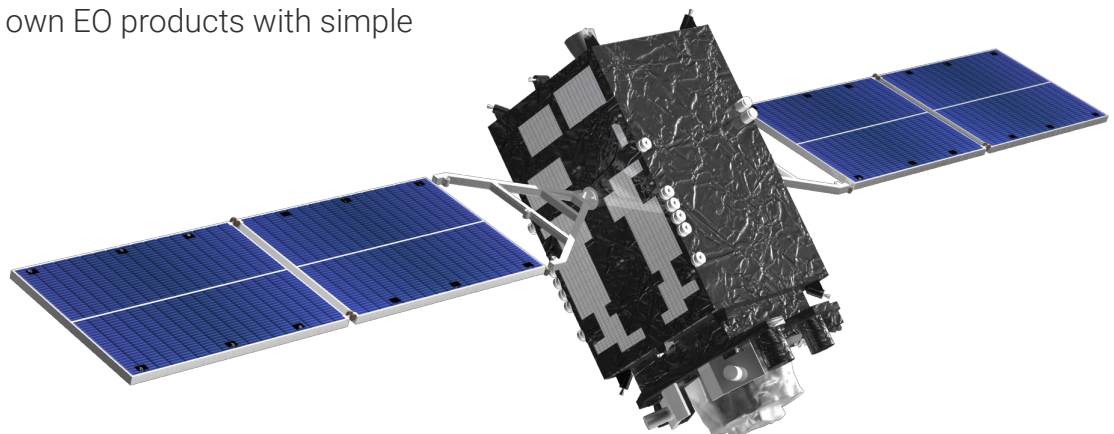
We are continuously updating these datasets and we plan to include many others in the future.

Real-Time Full Resolution Access over the Web

We have significantly reduced satellite data processing time, giving everyone an opportunity to find relevant data anywhere on Earth and dive into details in a matter of seconds.

Serverless Processing with JavaScript

Sentinel Hub offers numerous predefined visualization options, and allows you to create your own EO products with simple JavaScript configuration.



Multi-Temporal and Statistical Data Analysis

Experience the power of multi-temporal remote sensing that enables change detection and land cover classification. Perform statistical computations for a region of interest across different bands and time ranges.

Bring Your Own Data

Access your own data stored on your object storage with the powerful Sentinel Hub API. Data in COG format stays under your control. No replication is needed.

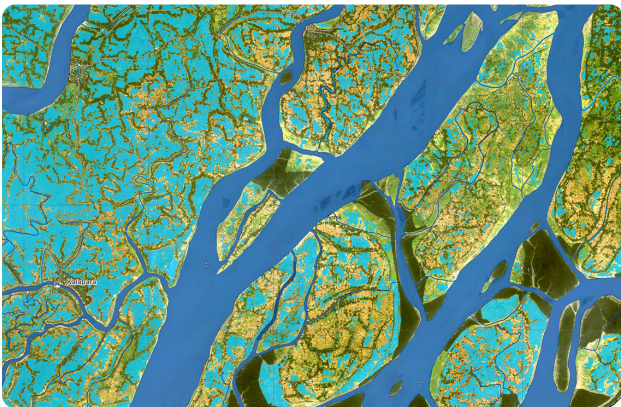
Use-Cases



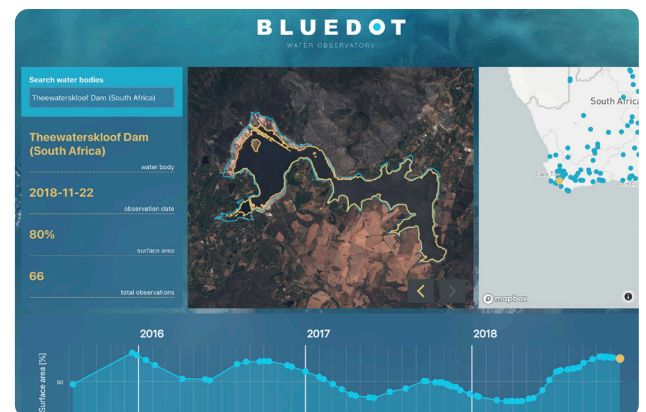
By monitoring vegetation changes over time, droughts can be monitored by comparing the current vegetation state to its long-term average.



Farmers and public authorities can take land monitoring to a new level.



Mapping natural phenomena such as floods can be valuable to insurance companies for risk and damage assessment.



Global historical and current data on water resources condition provide valuable information for predicting water crisis.

Developers & Data Scientists

Use in Desktop and Web Applications

Easy integration with desktop and web GIS such as ArcGIS, QGIS, MapBox, Carto, Google Maps, Leaflet, OpenLayers and others. Standard web services – WMS, WMTS, WCS and WFS – configurable and customizable with various output formats, projections and processing algorithms. You can easily use the services in existing products or develop new applications.

REST APIs for Advanced Feature Integration

Helping experts and software developers build new Earth observation services using our REST interfaces and open-source libraries.

sentinelhub Python Package

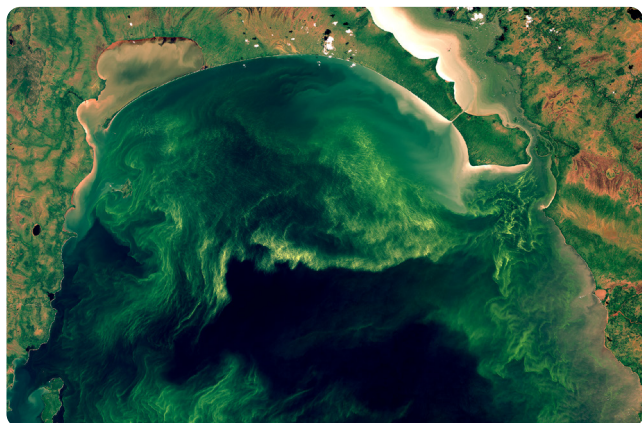
Allows users to make WMS and WCS web requests to download and process satellite images from various data sources within your Python scripts and Jupyter Notebook.

<https://github.com/sentinel-hub/sentinelhub-py>

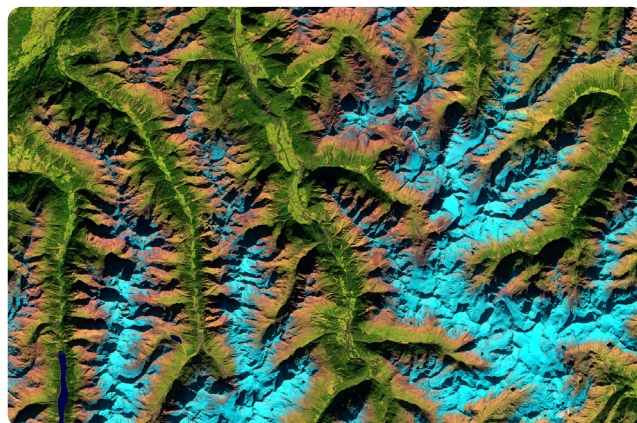
eo-learn for Easy Extraction of Valuable Information

eo-learn library acts as a bridge between Earth observation/Remote sensing field and Python ecosystem for data science and machine learning.

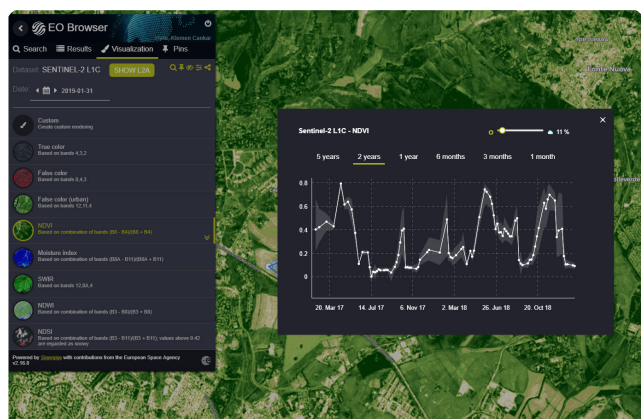
<https://github.com/sentinel-hub/eo-learn>



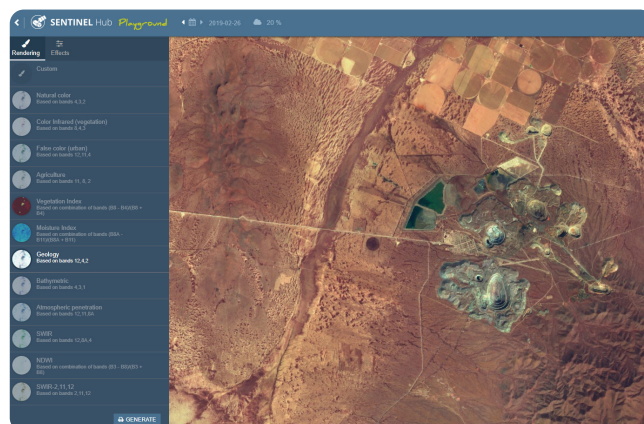
Satellite imagery is more and more used for reporting and helping journalists to present facts in objective way.



Frequent and systematic coverage to support the mapping of land cover, classification and change maps, accurate assessment of geophysical parameters, and more.



EO Browser



Sentinel Playground

Explore the World with Sentinel Hub

Sentinel Playground

Explore satellite imagery in an easy-to-use web application. Select from a variety of products or create your own.

<http://sentinel-hub.com/explore/sentinel-playground>

EO Browser

Query satellite data, inspect results in various colour composites in full resolution, and download for offline analysis.

<http://sentinel-hub.com/explore/eobrowser>

Fully Managed Service for Mass Processing of EO Data



Features

- Sentinel-1 GRD, Sentinel-2 L1C, Sentinel-2 L2A, Landsat 8, MODIS, PlanetScope, Pléiades, SPOT and others
- Same feature set as Sentinel Hub
- Information about partial results to use them as soon as available
- Parallel processing to ensure timely results over large area
- Automatic repeats for failed tiles
- Optimized for costs

Use-Cases

Machine Learning

Most of the ML processes in EO start with pre-processing of data to prepare features – packages of data with uniform spectral and temporal dimensions, of just the right size to fit in the ML task. This step can now be outsourced to Batch Processing, which will tile the area of interest (e.g. whole continent) in tiles of 10x10km or 20x20km, then fetch all available data in the area, prepare relevant indices and interpolations and output them to object storage. ML process can tap in the Batch Processing flow in order to use a tile as soon as it becomes available (and delete it afterwards). One can therefore process peta-bytes of data but still pay a minimum storage bill.

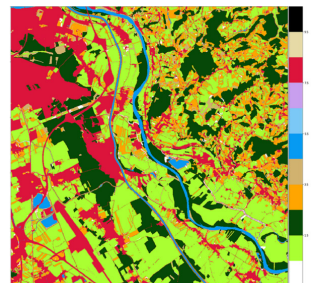
Large Scale Phenology Using Indices

Various vegetation indices (NDVI, LAI, fAPAR, fCover, etc.) are commonly used in the process and often there is a need to generate them for large area. E.g. weekly mosaics of specific index for a whole continent. This has never been easier – simply execute one API request and wait a few hours and data is there.

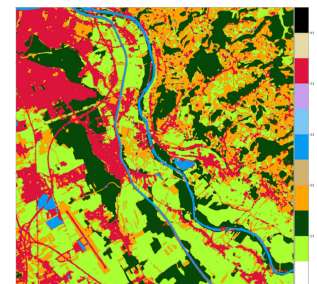
Cloudless Mosaics

For those, who need to create beautiful cloudless mosaics, e.g. quarterly or annual, there is a script for that. One can simply take the script choose an AOI and temporal period and run the process.

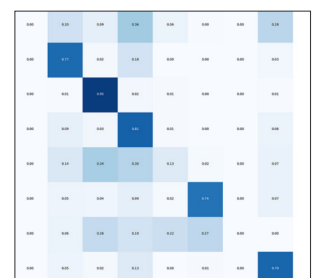
Ground Truth



Predicted



Confusion Matrix



Going Beyond Data Cube Access



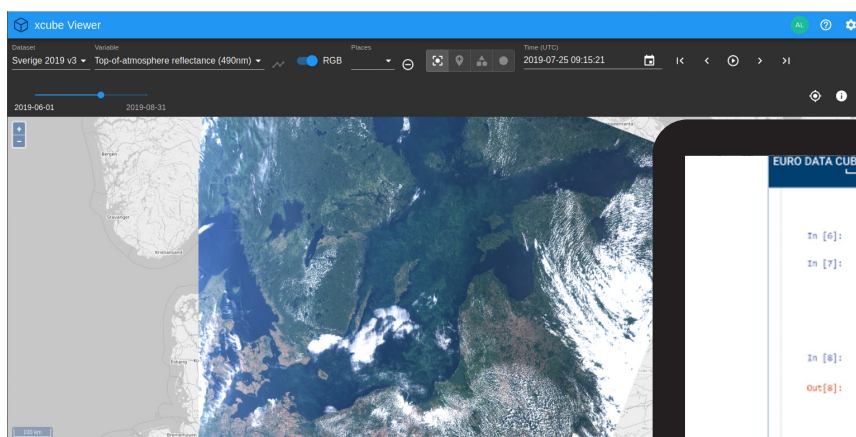
xcube services provide an end-to-end ecosystem for generating, exploiting, and publishing data cubes from different data sources in common formats and with free and open tools

Why use xcube?

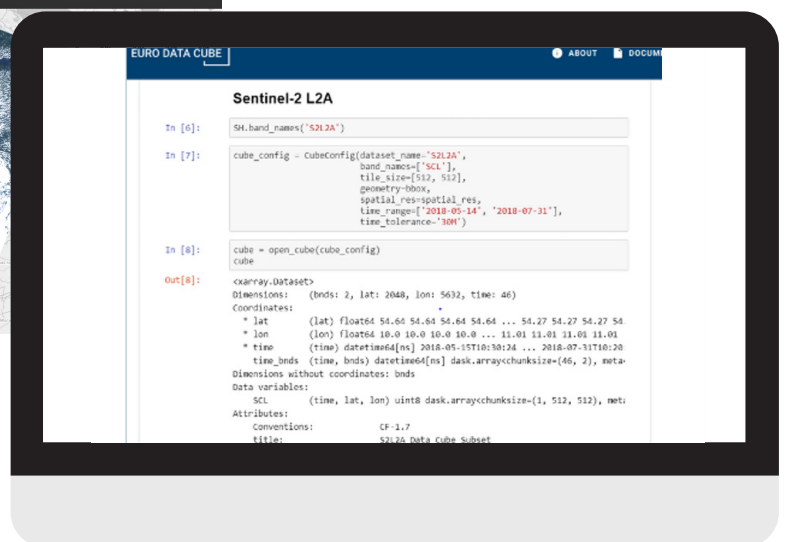
- Generate tailored data cubes from various EO and value-added data sets, persistent or on-the-fly in xarray data model
- Benefit from tools for convenient integration of feature data, e.g. shapes, time-series, also from geoDB
- Include ARD pre-processing into data cube generation
- Merge, analyse, and process data cubes
- Publish custom data cubes and create visualisation service
- Build applications and services using RESTful xcube web API
- Build processing workflows using the Python ecosystem and automate them (Function-as-Service)

Available Service

- On-the-fly data cubes from EO data via xcubeSH Python library
- Persistent data cube from various data sources with xcube gen service
- Storing, sharing, and publishing data cubes via xcube hosting Individual training and consultancy



xcube viewer and xcube Python API in Jupyter Notebook



Convenient and Seamless Integration with Data Cubes



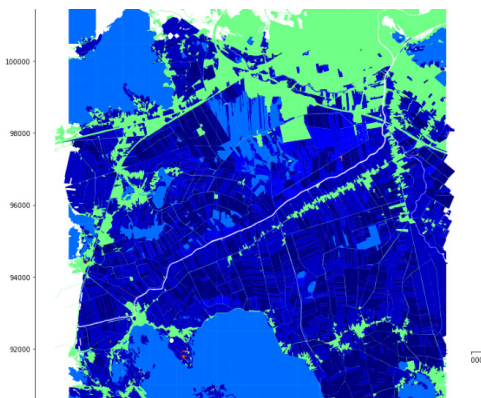
geoDB offers a complete solution to integrate and manage feature data seamlessly with gridded data provided by Euro Data Cube

Why use geoDB?

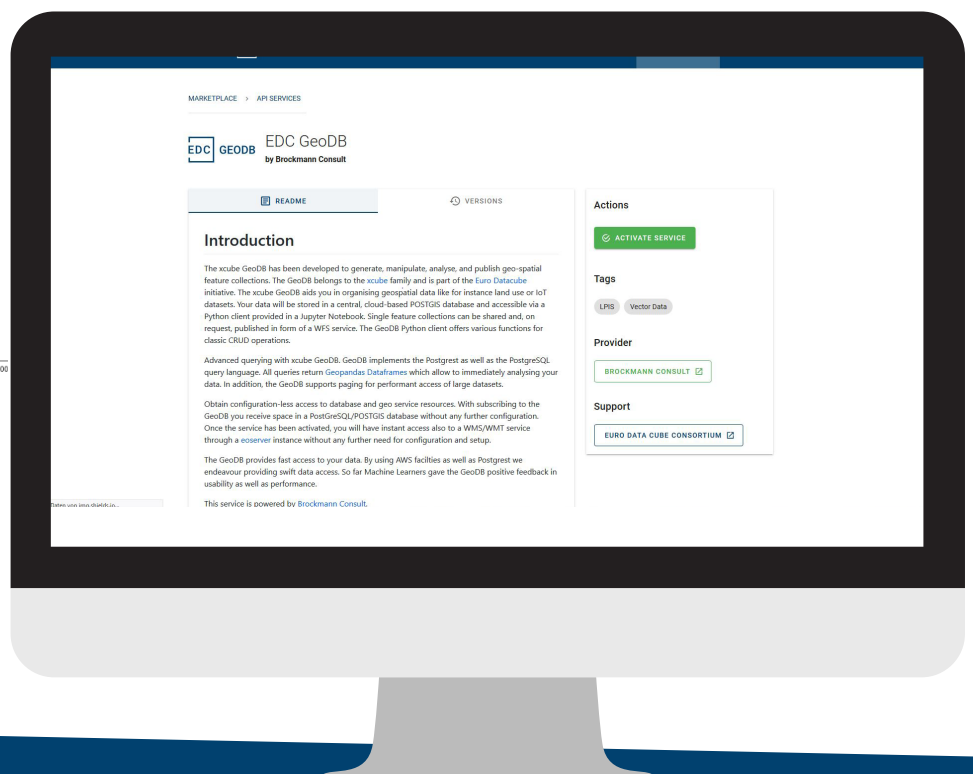
- Store and organise feature data of any size including shape files, in situ data, time-series and others Publish data sets and manage access to them
- Access data sets available in geoDB
- Get access to valuable feature data sets available in geoDB
- Seamlessly integrate feature and gridded data of any size sets, thus greatly facilitating applications like machine learning, AI, and
- Store results of your computations back into geoDB
- Sell value-added feature data sets to other users"

Available Service

- Managed geoDB for data providers who want to host and publish their feature data while having full control of data access by users
- geoDB Access service for read-only access to data sets available in geoDB



Visualisation of land use feature data with xcube geoDB



The Marketplace and Workload Management Platform Solution



**EOXHUB
WORKSPACE**

Discover and Unlock Services

Browse through descriptions of managed Services, subscribe to Service plans and receive tokens unlocking the APIs for you. Deploy and consume ready-made Jupyter Notebooks and EO applications. Easy-to-read Getting Started documentation helps you to a quick win

Scale your Workload

Right-scale your computing resources and cloud utilization dynamically adapting to your workload requirements. Transparently use the cloud infrastructure provider of your choice.

Collaborate and Do Business on Marketplace

- Share your data and algorithms with the science community or customers. Fully self-serving, both for Jupyter notebooks as well as for EO applications. Contributions are backed by public git repositories, providing code transparency and auditability
- Sell your API Services and custom data contributed for use by your customers
- Define license models for contributions either for a free or revenue-generating use
- Let the marketplace service manage the administrative steps for you
- Make revenues when customers subscribe to your contributions

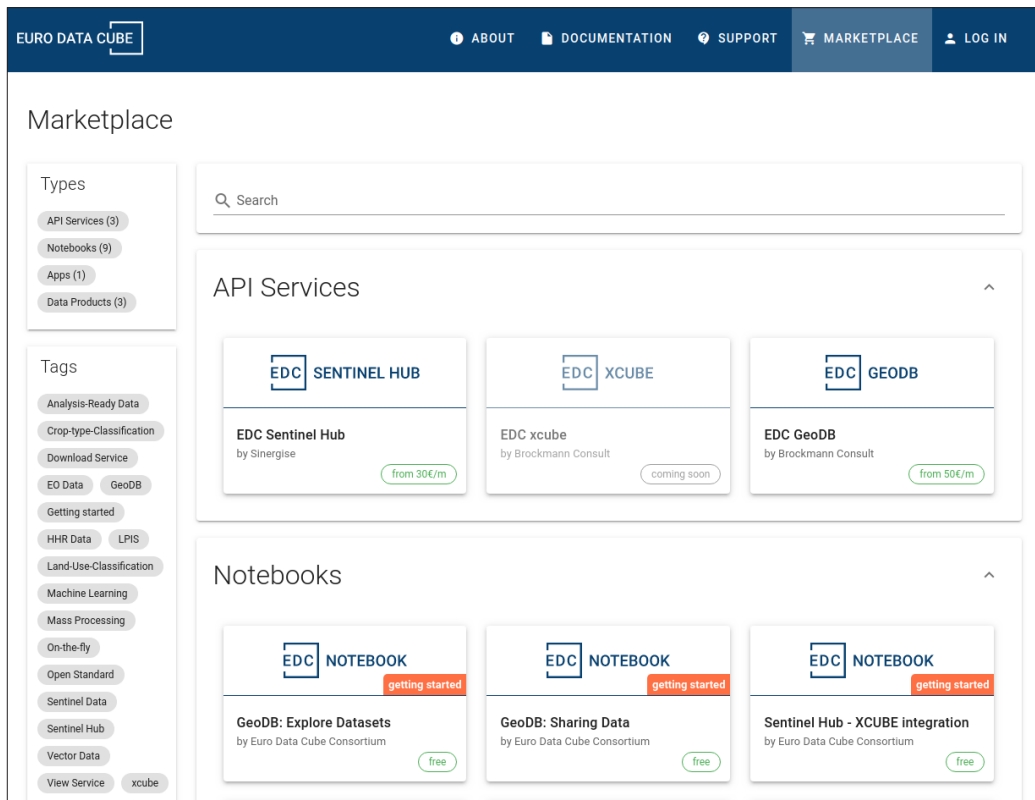
Keep Track using the Dashboard

- A central place to track your subscriptions, your data orders and your invoices
- Stay informed about any changes and expirations
- Get notified when free Promotional Plans exhaust and upgrade to plans designed to optimally fit your needs
- Keep an overview of your own environment, your app deployments and your resource consumption



Marketplace & Workload Management

Discover and Unlock Services



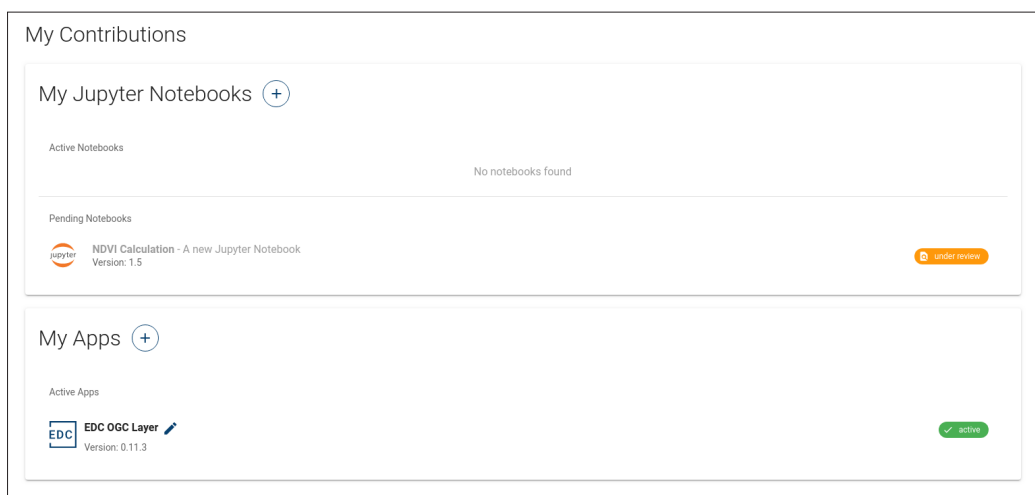
EDC marketplace of managed API Services and Jupyter Notebooks offered for subscription.

Scale your Workload

The EOxHub Workspace offering provides all necessary computational resources and storage to run your installed Jupyter Notebooks and your deployed Applications.

It includes a managed JupyterLab offering with curated base images ready to kick off your EO workloads.

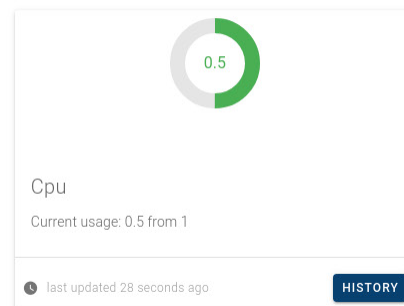
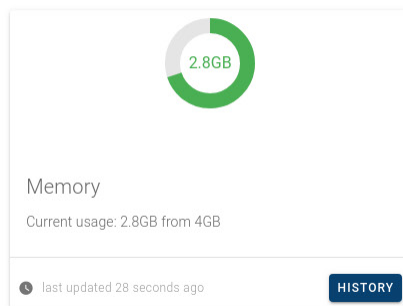
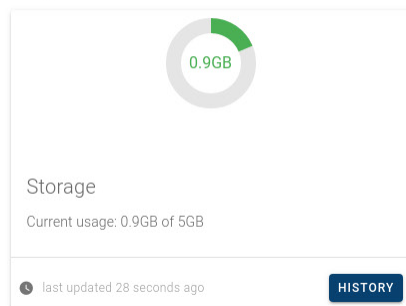
Collaborate and Do Business



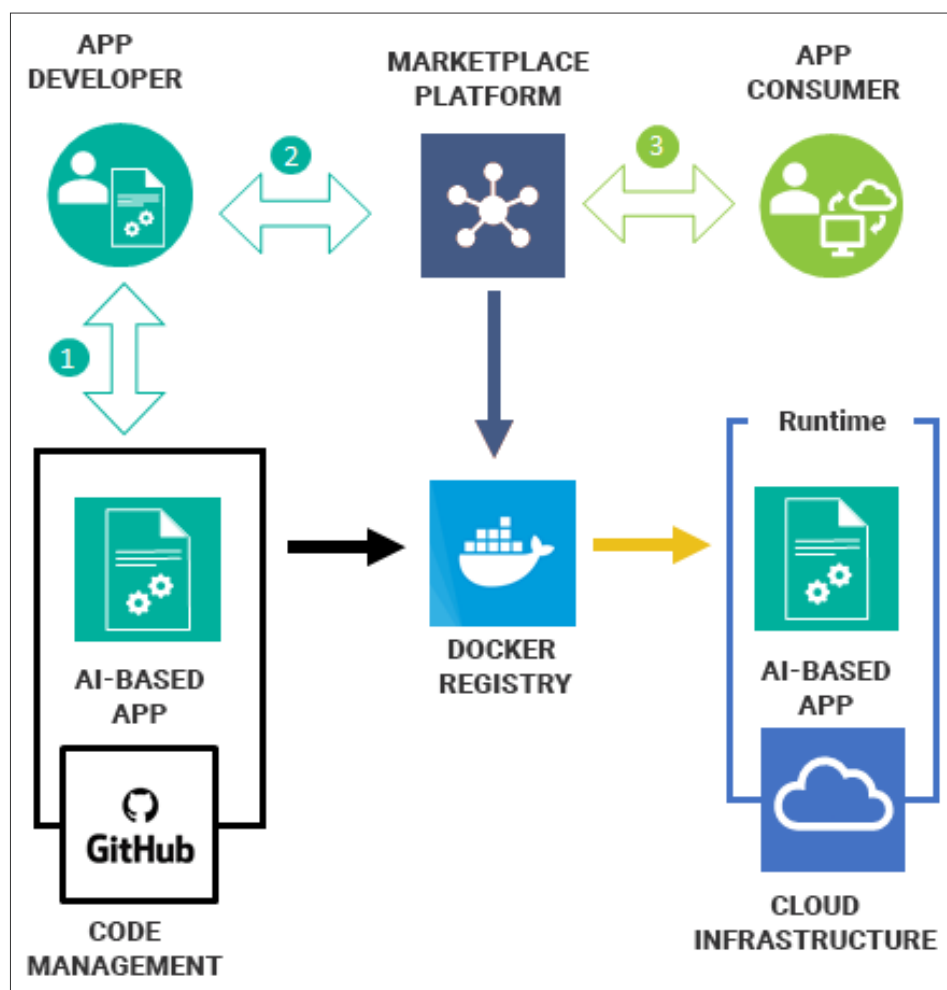
Functions for managing of user-contributed Jupyter Notebooks and EO applications

Keep Track using the Dashboard

Usage



Display of subscribed plans, deployed applications and compute resource consumptions



Promote and
**sell your
solutions** on the
marketplace!

<https://eurodatacube.com>

Euro Data Cube services are operated by a consortium of companies lead by Sinergise Ltd., Cvetkova ulica 29, SI-1000 Ljubljana, Slovenia. The billing is managed by EOX IT Services GmbH, Thurngasse 8/4, 1090 Vienna, Austria.