Earth Observation for Ukraine (EO4UA)

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[1] CloudFerro, [2] Kyiv Polytechnic Institute

Outline

EO4UA

1. Introduction to CloudFerro and the EO4UA initiative by Jędrzej Bojanowski
2. Technical details on EO4UA data and services by Jan Musiał
3. Analysis of current status of agriculture in Ukraine by prof. Nataliia Kussul
4. QA & Discussion

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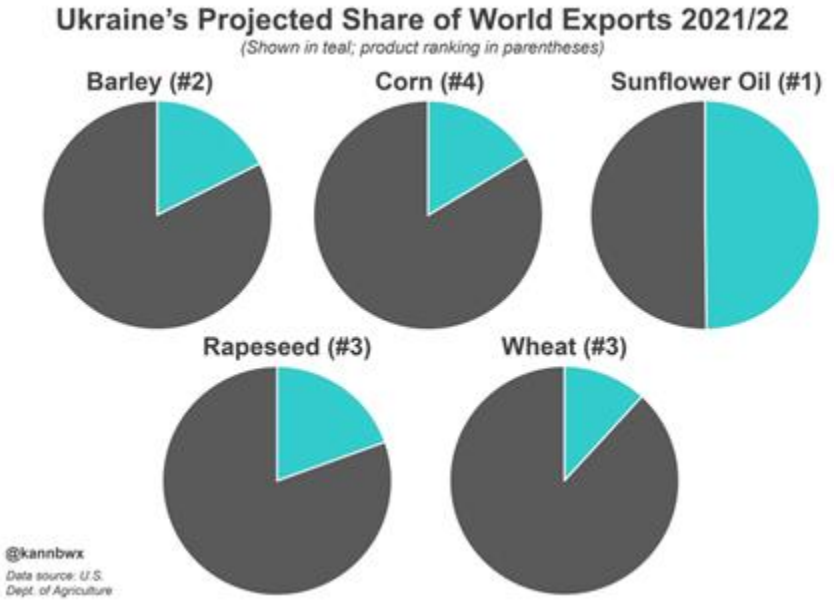
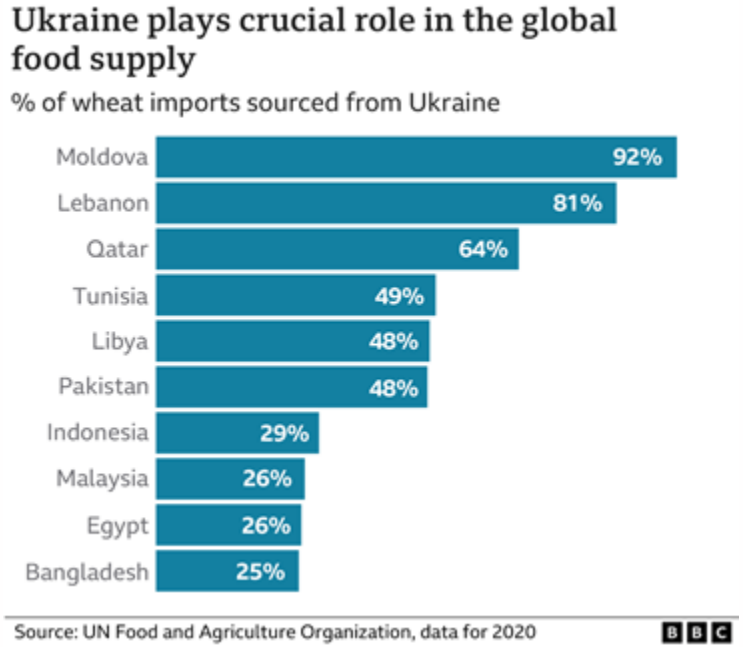
Ukraine is a granary of global importance





JRC MARS Bulletin of 12 September 2022

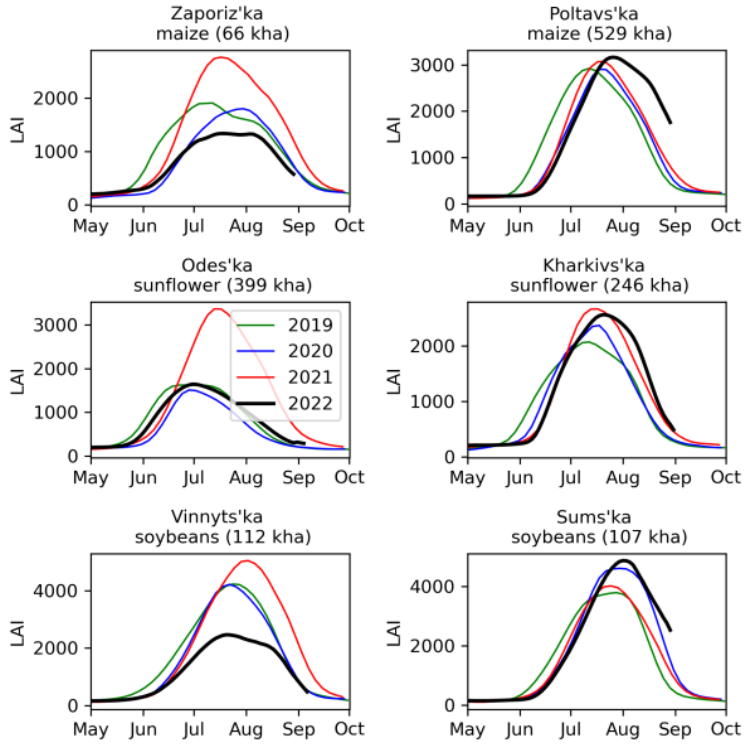


Figure 2. Leaf Area Index (LAI) profiles for maize, sunflower and soybean in selected oblasts. Trends are extracted for parcels identified for given crop type and compared to previous years.

EO4UA mission

The EO4UA is a bottom-up initiative that aims at:

- provisioning EO data and cloud services to our Ukrainian partners to allow them for continuing their research work
- supporting Ukrainian and international authorities in assessing environmental losses by provisioning processing capabilities combined with a large repository of satellite data and higher-level products generated by us and other EO4UA members
- processing, storing and sharing analysis ready data (e.g. Sentinels' imagery, boundaries of agricultural fields, etc.) which are indispensable for environmental analyses.
- storing and sharing products and analyses generated by EO4UA partners to facilitate consecutive studies.

Who we are and why we are the ideal initiator of EO4UA?

CREODIAS commissioned by ESA and European Commission – a public cloud computing platform enabling immediate and free access to >28PB online EO satellite data, together with user tools and resources for its processing;

WEkEO contracted by **EUMETSAT** – second DIAS built by CloudFerro, where we deliver cloud computing and storage services; platform provides meteorological satellite data, provided by the key EU entities: EUMETSAT, ECMWF, Mercator Ocean

EO Cloud for **ESA** – Earth Observation Innovation Platform Testbed

Climate Data Store

CDS ordered by **ECMWF** – hybrid cloud computing providing access to climate data, analyzes and forecasts in time and space scales, built and operated by CloudFerro

CODE-DE commissioned by **DLR** – a national EO platform providing easy and free access to EO data for Germany and efficient processing environment; users can benefit from a synergy with the CREODIAS platform that ensures efficient use of resources as well as an autonomy for key national processes

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EO4UA members

EO4UA

Academia

+

Companies

+

Data platforms

CloudFerro

EO data available within the EO4UA

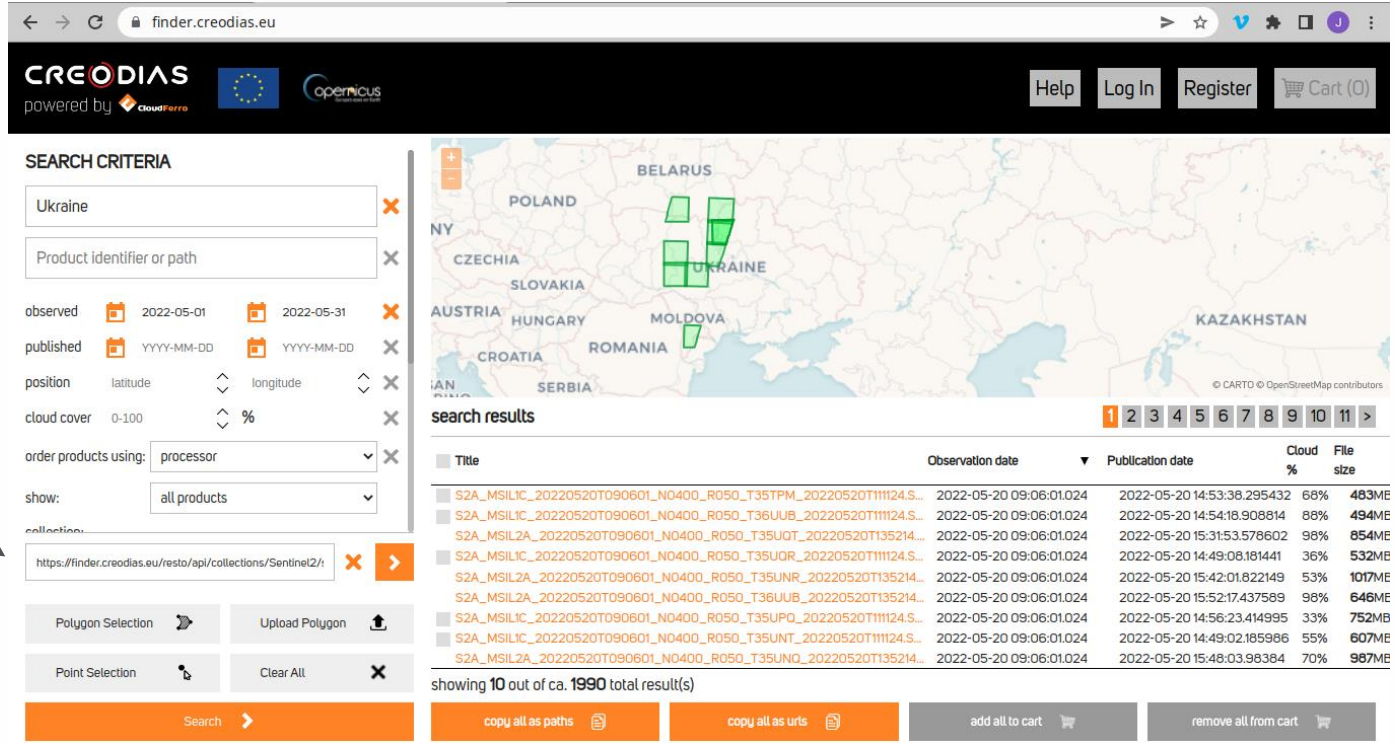
Products available on the CREODIAS platform:

- Sentinel-1,-2,-3,-5, Landsat and other Copernicus products available via CREODIAS Finder and Browser

CREODIAS finder https://finder.creodias.eu

EO4UA

REST query



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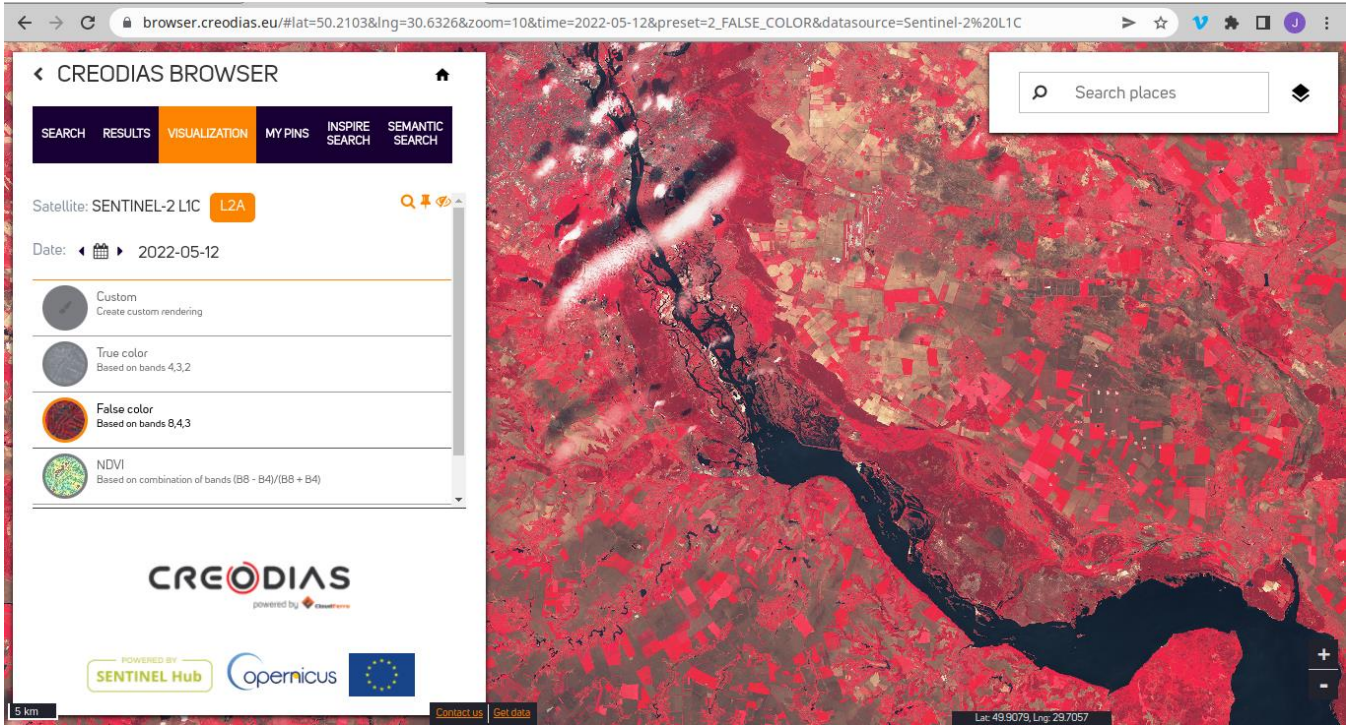
CREODIAS browser https://browser.creodias.eu

EO4UA



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EO data available within the EO4UA

Products available on the CREODIAS platform:

- Sentinel-1,-2,-3,-5, Landsat and other Copernicus products available via CREODIAS Finder and Browser

Products available within federated EO4UA repository:

- Sentinel-1 CARD-BS gamma0 backscatter (CloudFerro)
- Sentinel-1 coherence 12 days (Vista, JRC)
- Sentinel-2 MAJA Level-2A reflectance (CODE-DE) <- to be processed further
- Sentinel-2 WASP Level-3A mosaic (CloudFerro) <- to be generated
- In-situ data from JECAM network for Ukraine (Kyiv Polytechnic Institute)
- Crop Type Classification in Kyiv Region in 2021 (Kyiv Polytechnic Institute)
- Forest fires in Kyiv Region in March 2022 (Institute of Geodesy and Cartography)
- Agricultural field boundaries in years 2016-2022 from Sentinel-2 (Sentinel Hub)

CREODIAS cloud computing
powered by CloudFerro

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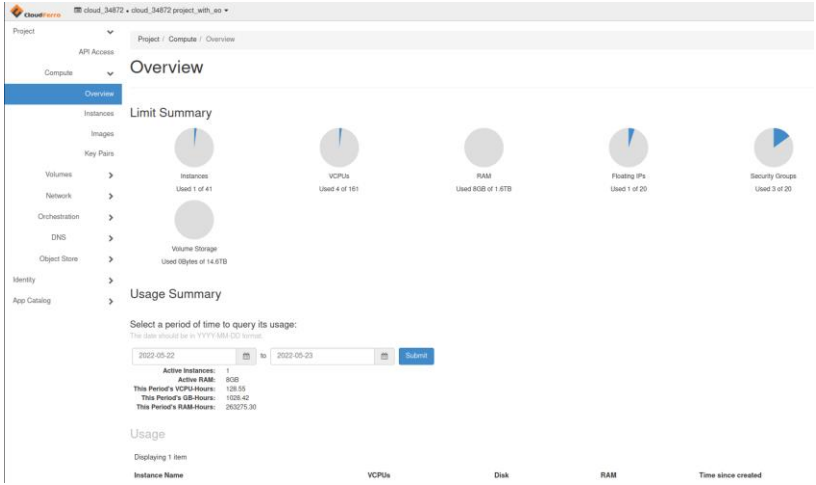
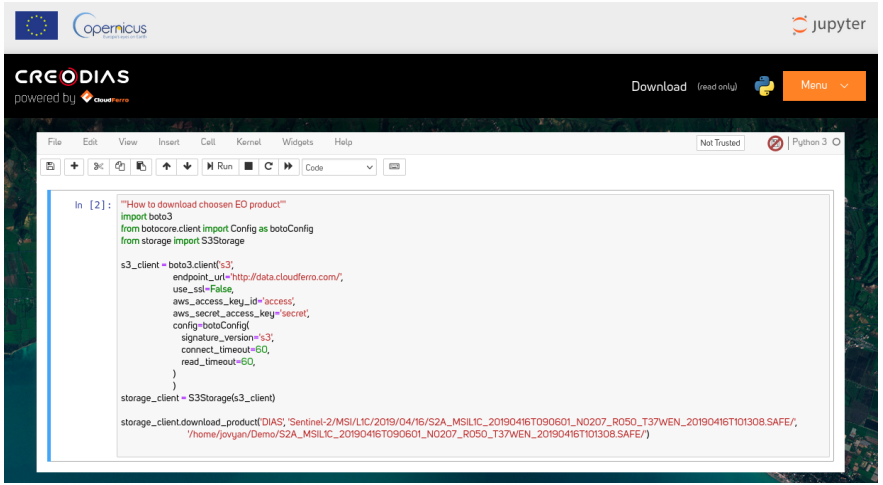
Horizon platform to manage VMs



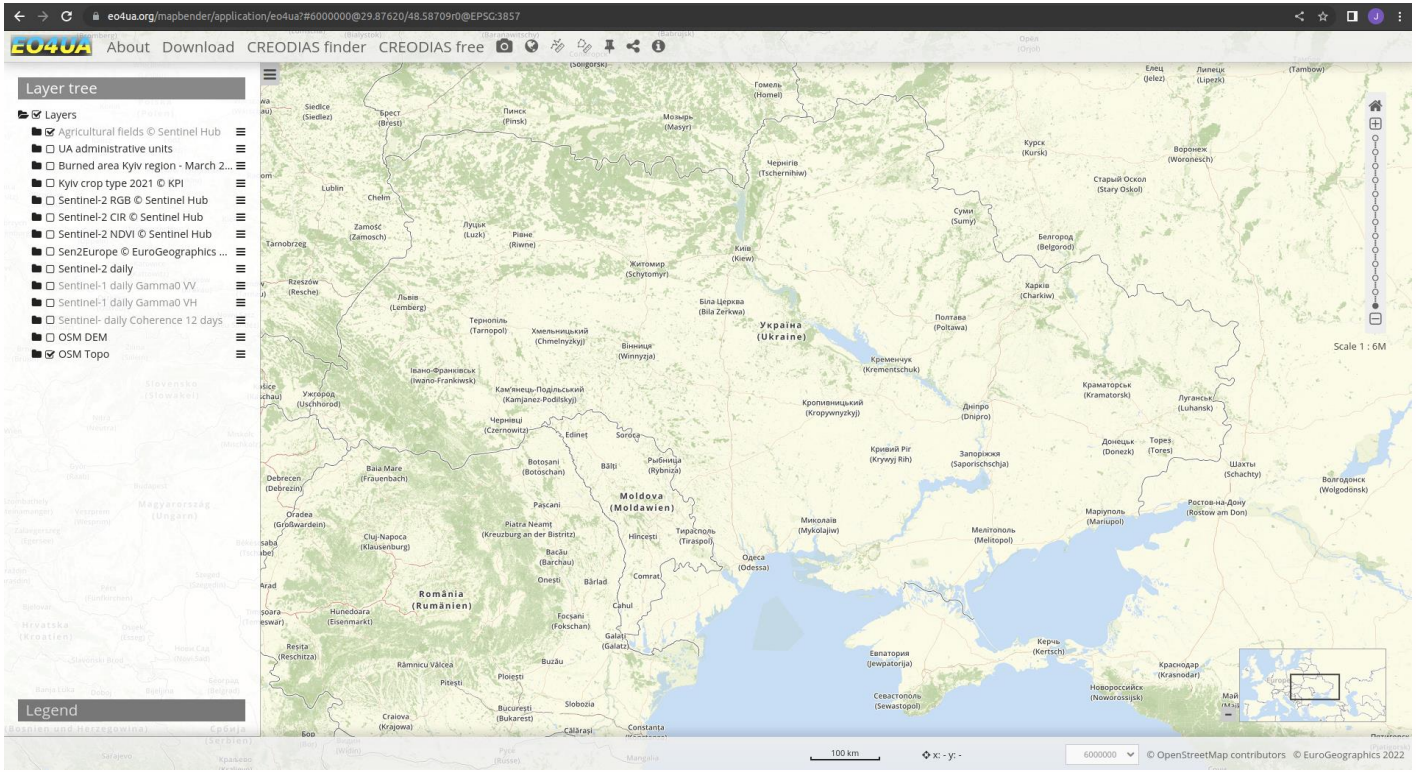
Jupyter Notebook



There is a possibility to test CREODIAS platform for free within 150 EUR limit.
Tutorials/Webinars, on how to use CREODIAS cloud are available on YouTube.

CloudFerro

EO4UA geoportal www.eo4ua.org



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Agricultural fields from Sentinel-2

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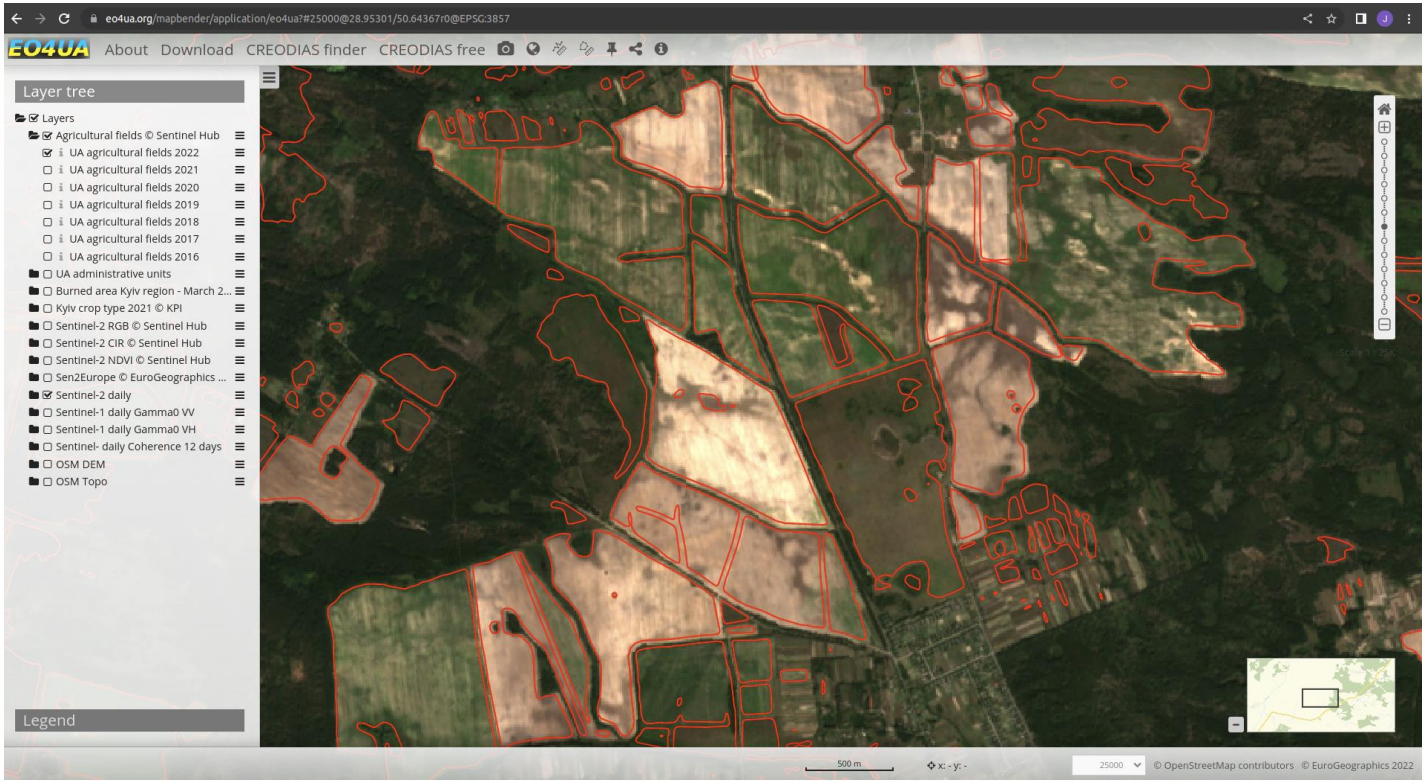

sentinelhub by SINERGISE

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Daily! Sentinel-2 reflectance

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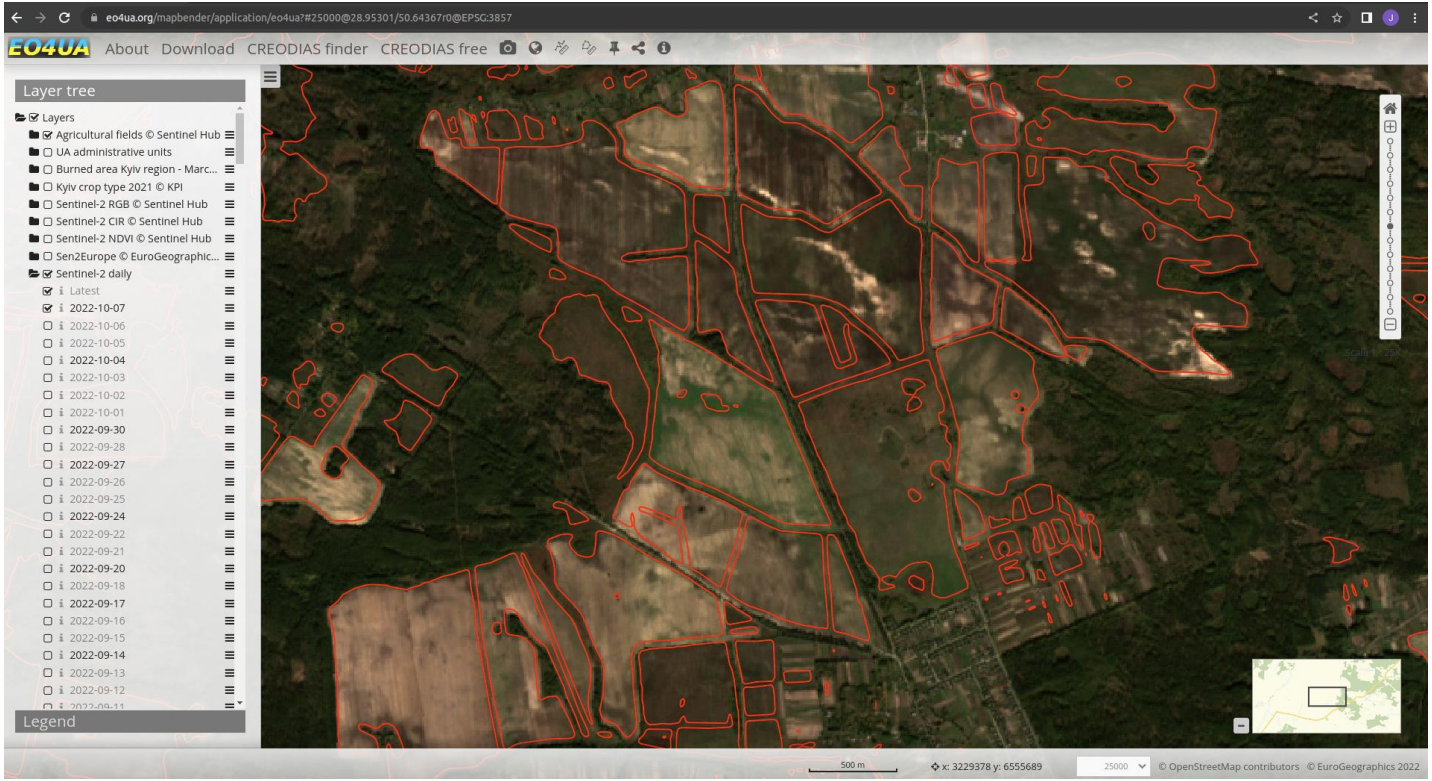

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Daily Sentinel-1 backscatter & 12-days coherence

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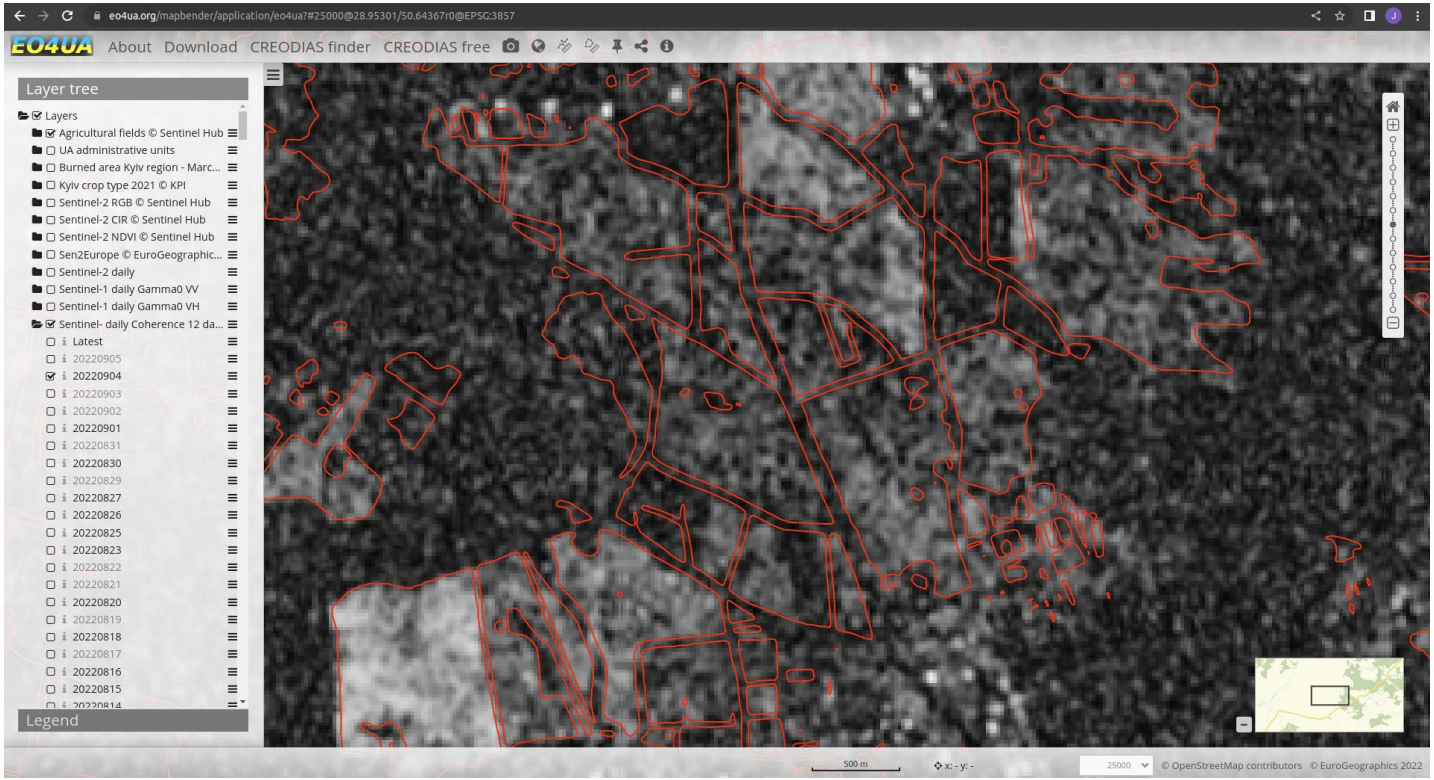

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Analysis of war damage in Mariupol

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Joint Research Centre
JRC

12-days S1A coherence composite highlighting Mariupol destruction
March 16 - March 28, March 28 - April 9 and April 9 - April 21

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Forest fires near Kyiv – March 2022

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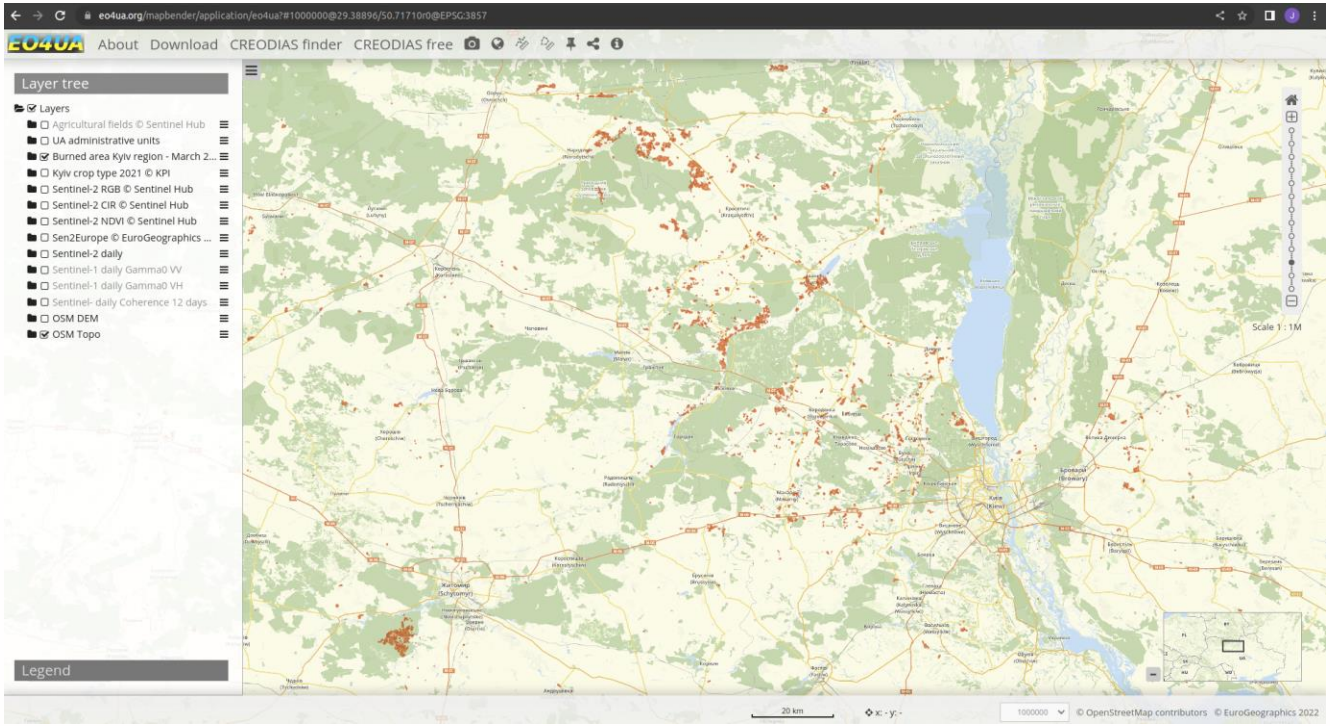

IGiK

https://inconada.eu

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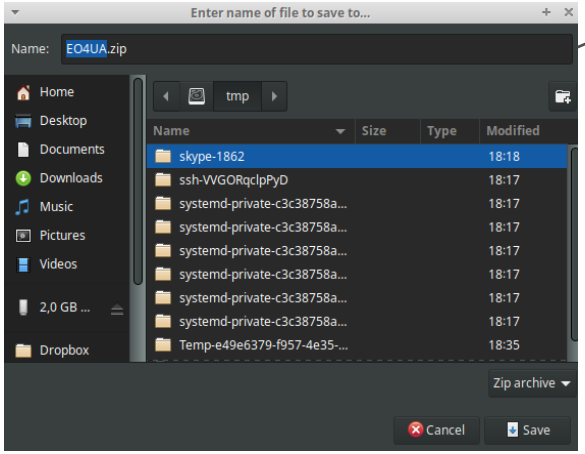
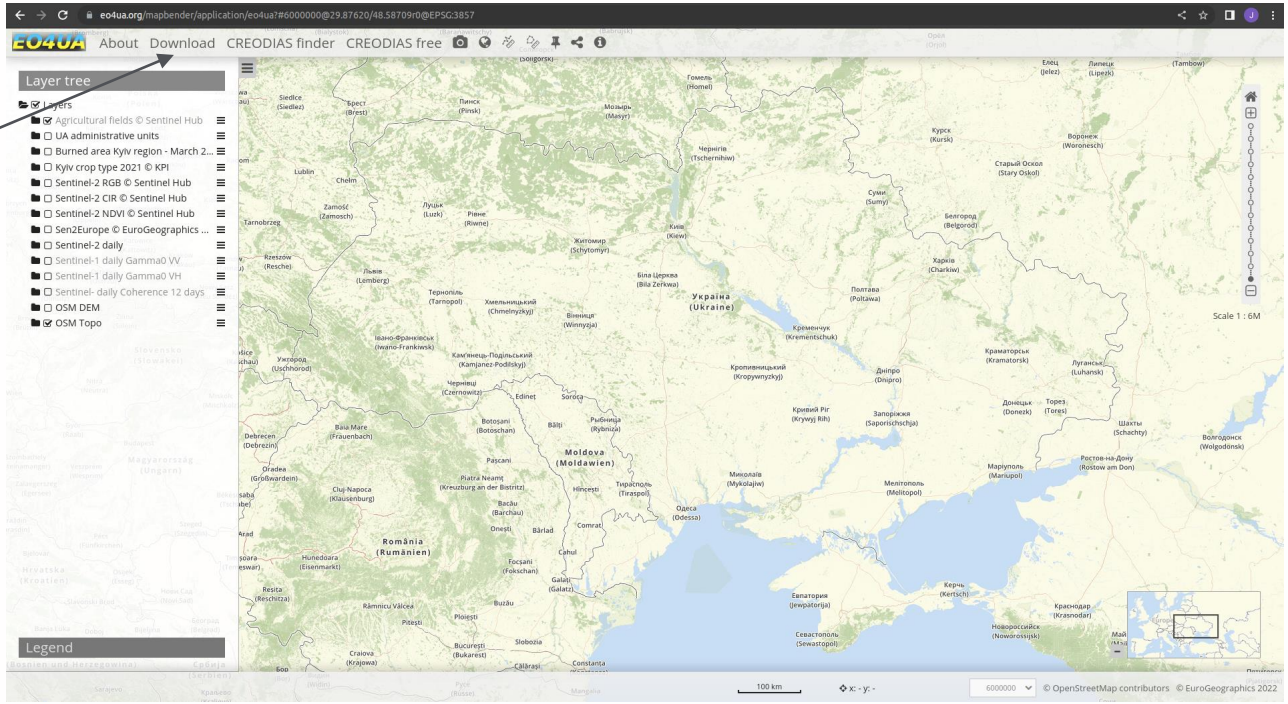
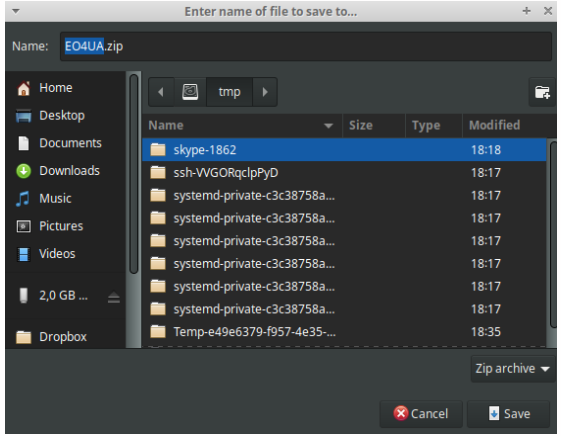
How to access data? 1-st method



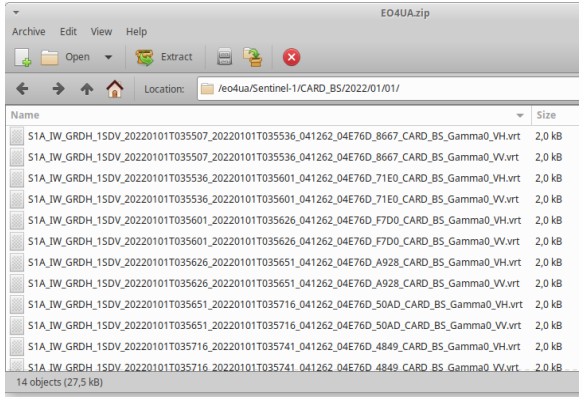


Entire EO4UA repository is zipped? How is it possible? EO4UA

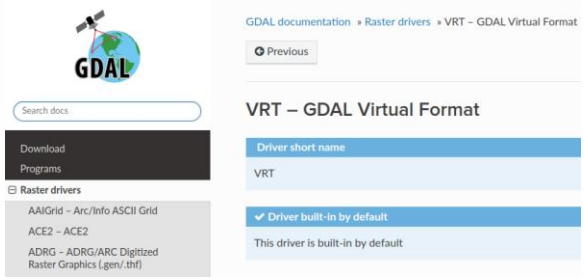
Zipped EO4UA repository...



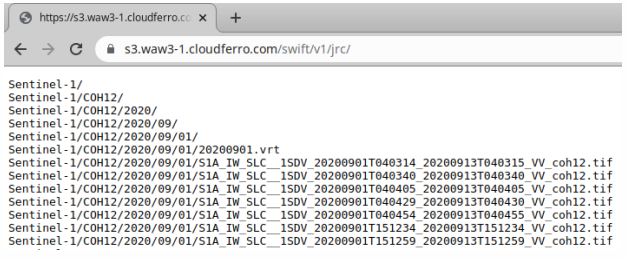
… contains VRT text files



VRT headers points to...



… COG files in S3 CREODIAS storage



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Cloud optimized formats suitable for streaming

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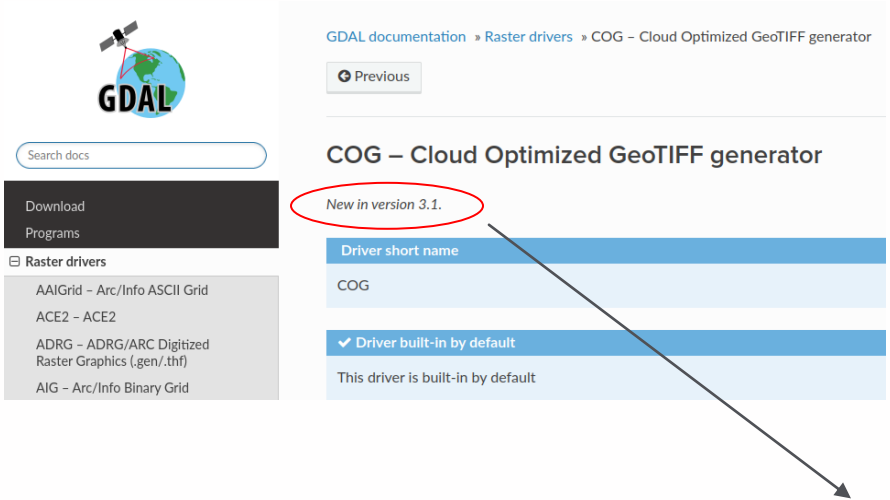
COG for rasters



FlatGeobuf for vectors

Important!! Cloud optimized formats requires GDAL >= 3.1
Make sure your QGIS has a recent GDAL version.

CloudFerro

How to access data? 2-nd method

EO4UA repository can be directly mounted in file explorer using
Samba share = Windows network folder

On Unix systems type: smb://data.eo4ua.org/eo4ua

On old Windows systems type: \\data.eo4ua.org\eo4ua

Login: anonymous
password: none

Important!! On new Windows 10 and 11 Samba client is disable by default!

EO4UA next steps

EO4UA

1. Supporting **Ukrainian** and international institutions/entities by centralizing more and more datasets for Ukraine and by offering cloud computing resources.

2. Adding meteo data for Ukraine for environmental (e.g. crop yields) modeling.

3. Involving new EO4UA members.

4. Seeking for long-term financing.

5. Development of WMS/WFS services based on Kubernetes to allow for scalability.

6. Creation of custom cloud computing environment dedicated to EO4UA based on Linux, STACK, Open Data Cube, OpenEO.

CloudFerro


EO4UA join us!