

CoRdiNet Data Access Webinar

The CoRdiNet project is financed by the European Commission under the Horizon 2020 program, grant no. 821911.

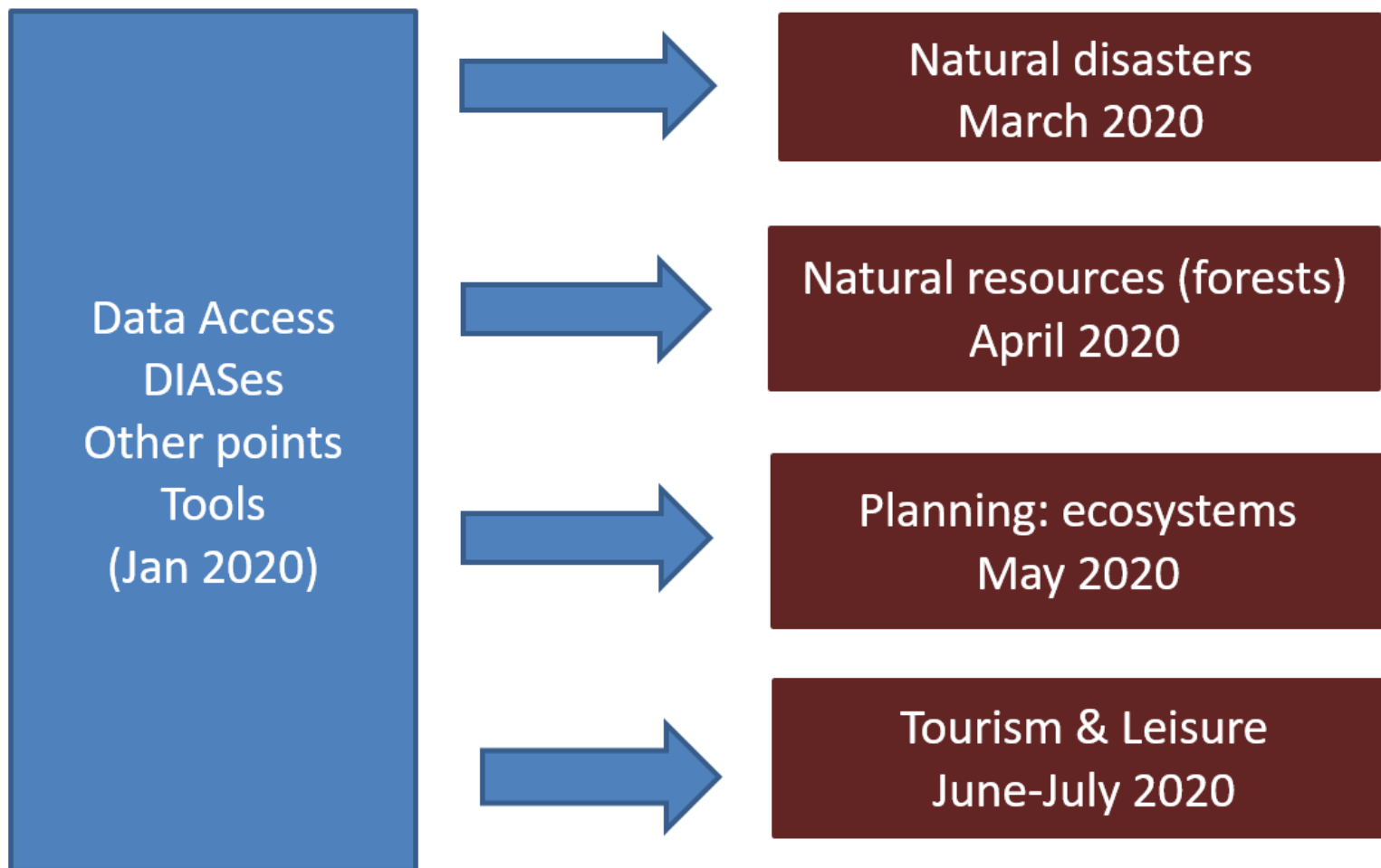


CoRdiNet

- Digitalization and new business solutions based on Copernicus
- Local expertise in the civil use of Earth observation close to the needs and offers of citizens, administration and businesses
- Calls for proposals and funding for projects that foster Copernicus user uptake

cordinet.net

Train the trainer webinars



Data Access

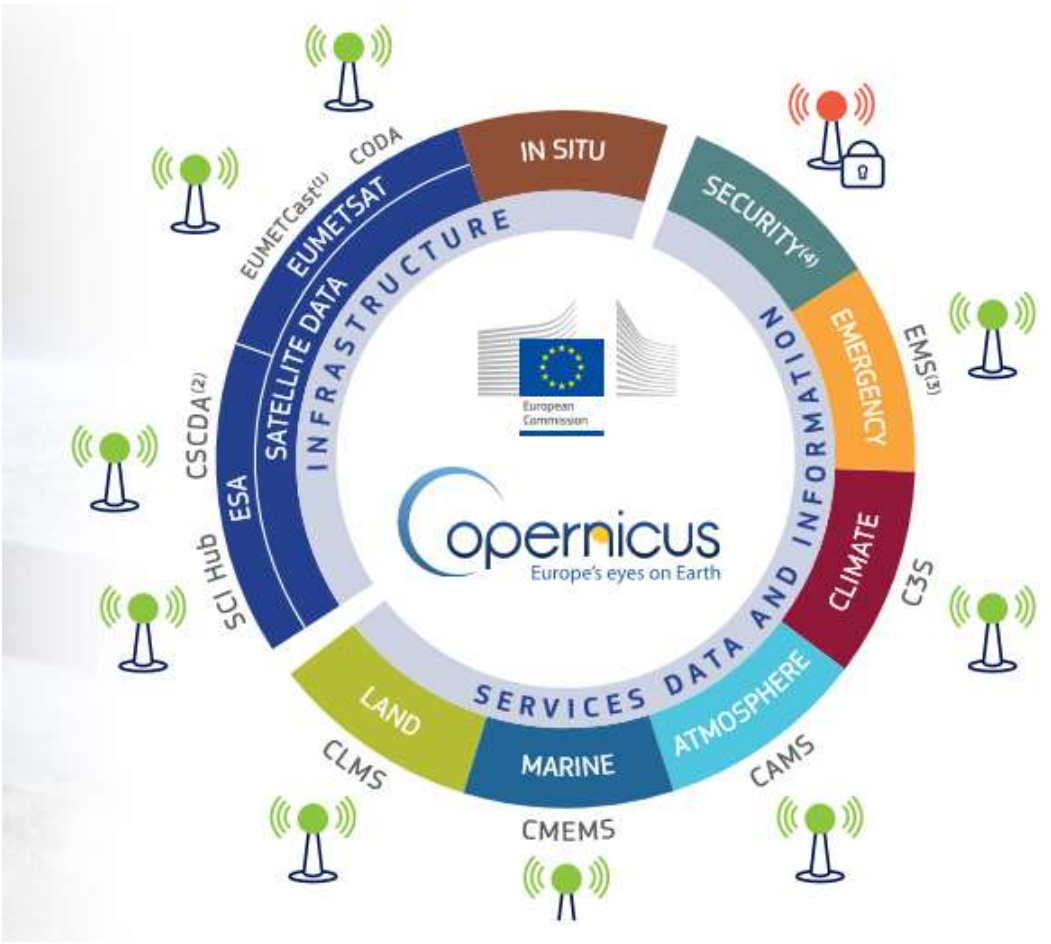
- What do we mean by data?

Satellite data

- Satellite Data distribution Hubs
- Sentinels
- Contributing missions
- Access to images in NRT
- Access to archives

Services: data and information

- Added value products
- Models
- Archives, Near Real Time and Forecasts products



Data Access

Imagery

Data and processing

Services: data and information, forecasts...

Data Access

✓ **Imagery**

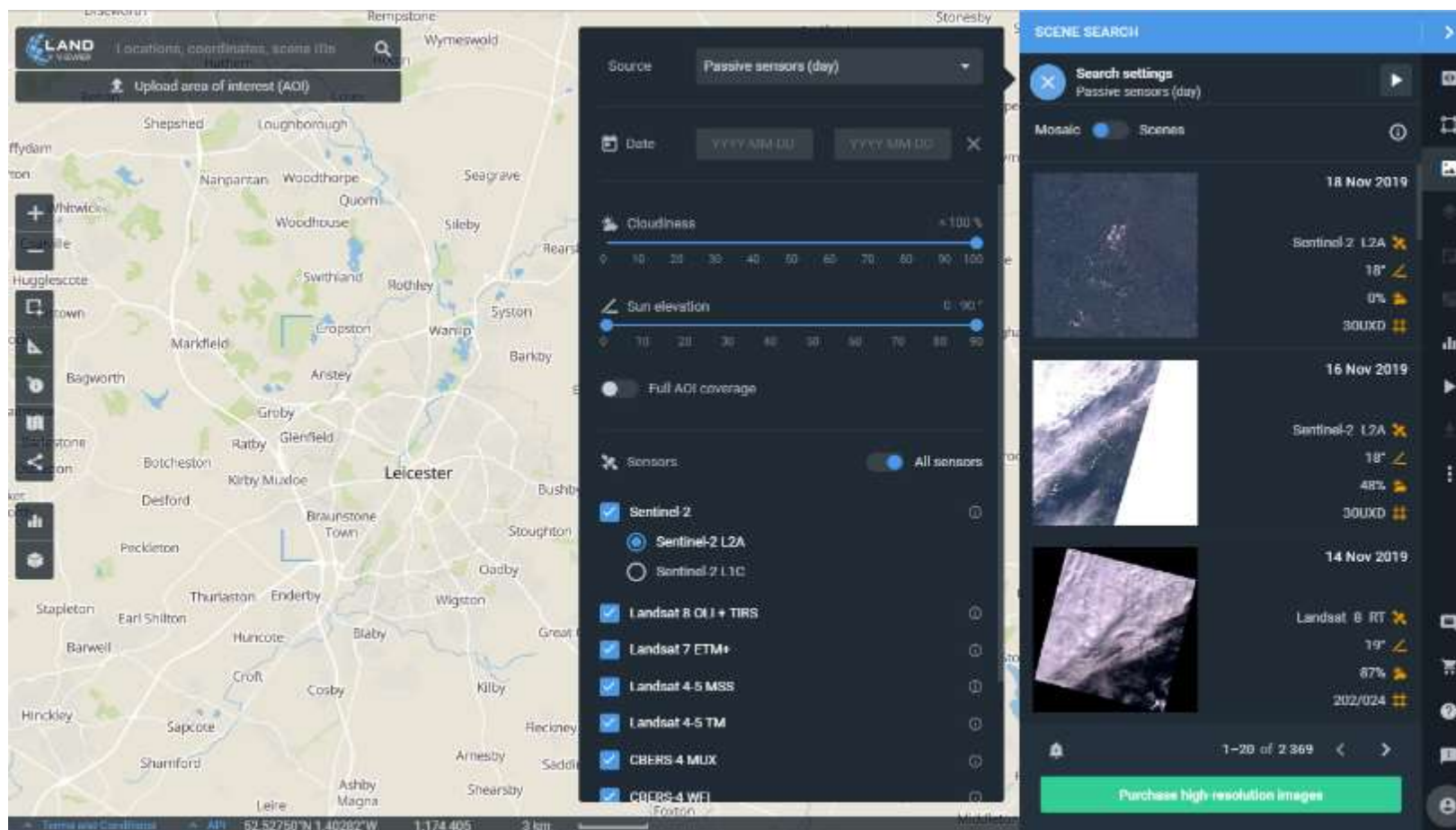
Data and processing

Services: data and information, forecasts...

Imagery Land viewer

- Free-of-charge application
- Developed by EOS <https://eos.com/>
- A complete archive of Sentinel data and other missions
- A choice of on-the-fly imagery analytics

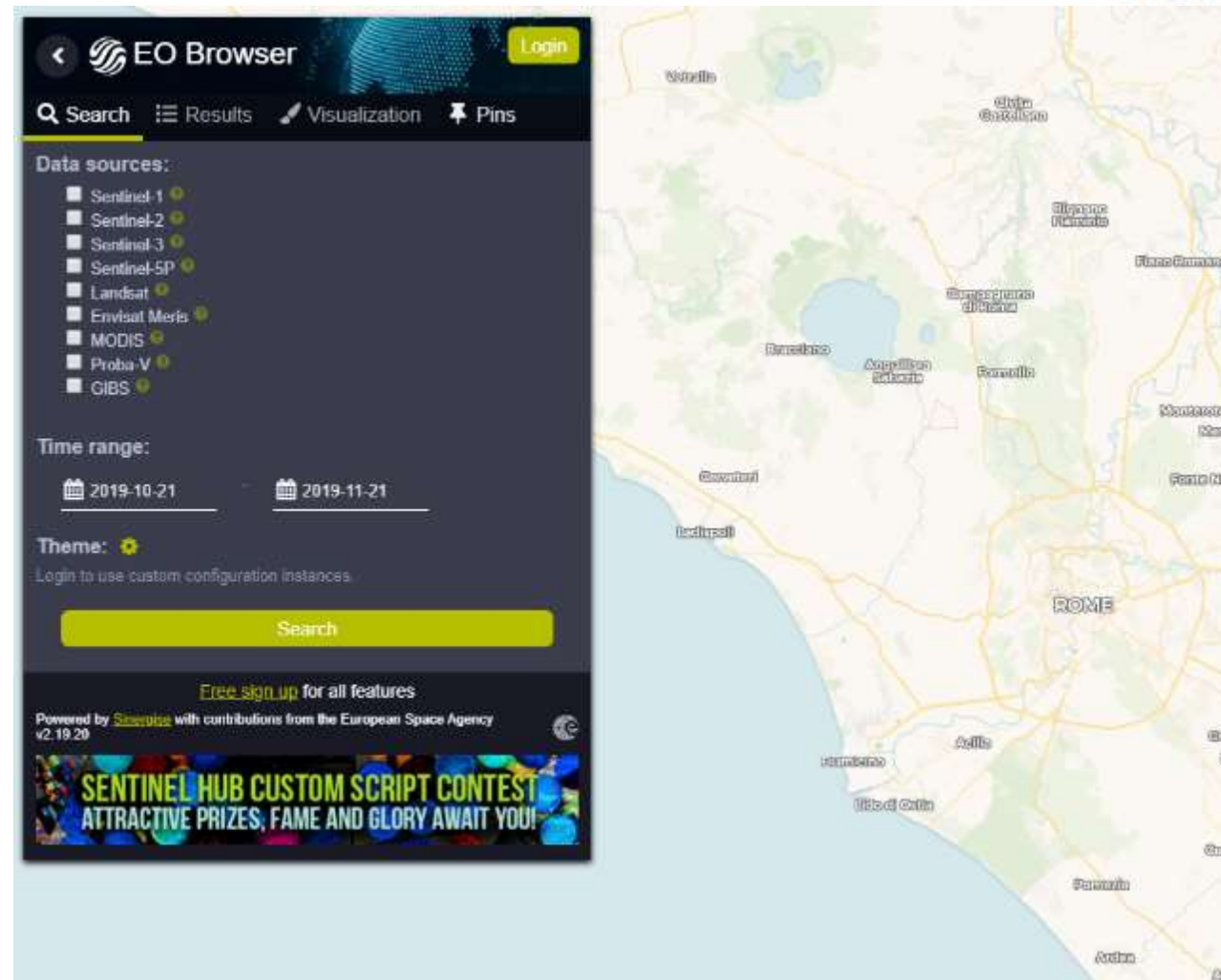
<https://eos.com/lv/>



Imagery EO Browser

- Free-of-charge application for non-commercial and media use
- Developed by [Sinergise](https://www.sinergise.com/)
- A complete archive of Sentinel data and other missions
- Comprehensive tutorial

<https://www.sentinel-hub.com/explore/eobrowser>



Data Access

Imagery

Data and processing

Services: data and information, forecasts...

Data Access – satellite data



Copernicus Open Access Hub

<https://scihub.copernicus.eu/>



<https://spacedata.copernicus.eu/>

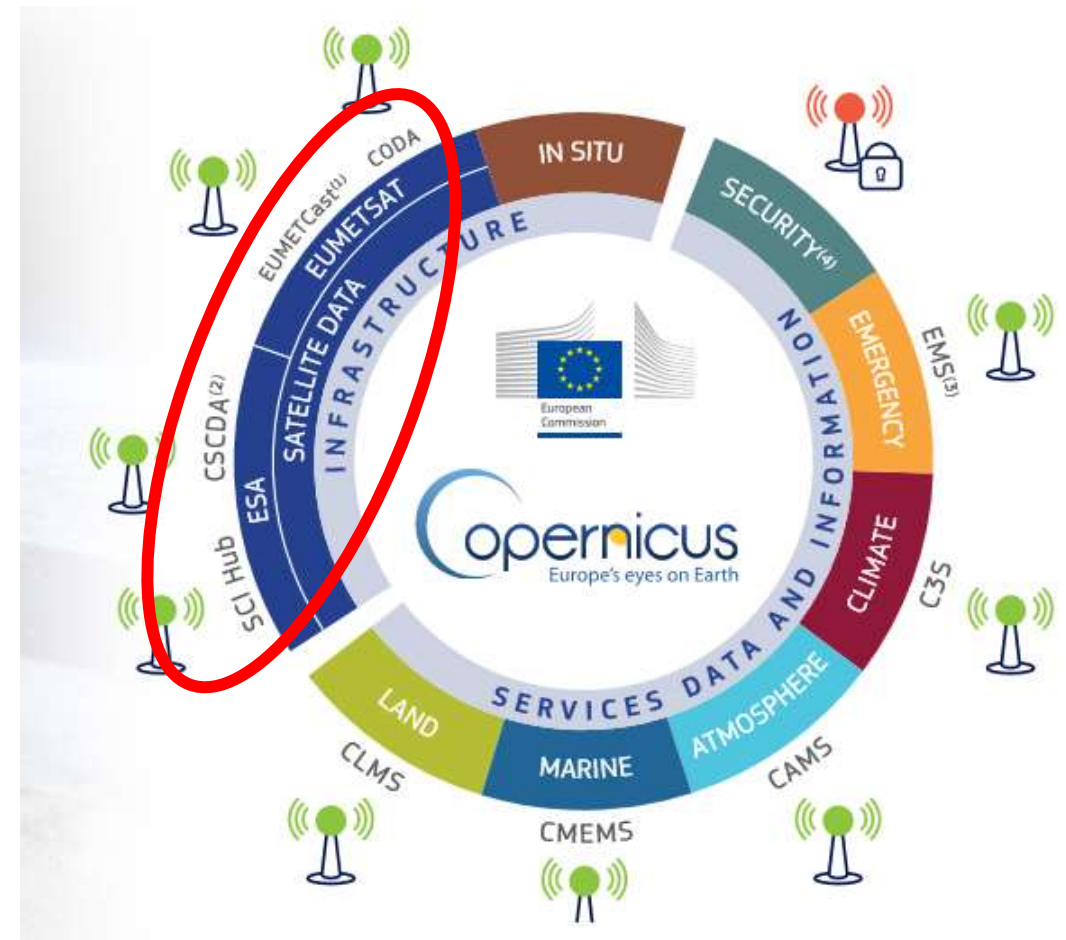


COPERNICUS ONLINE DATA ACCESS

EUMETSAT DATA CENTRE



- Registration required
- Anyone can register
- User Guide available
- Data sets with different access rights
- Environmental data
- Can be accessed with EO Portal account
- Data archives and online access
- Youtube Tutorials – how to access and to visualise Copernicus data



Data Access – satellite data

Copernicus Open Access Hub

<https://scihub.copernicus.eu/>



<https://spacedata.copernicus.eu/>

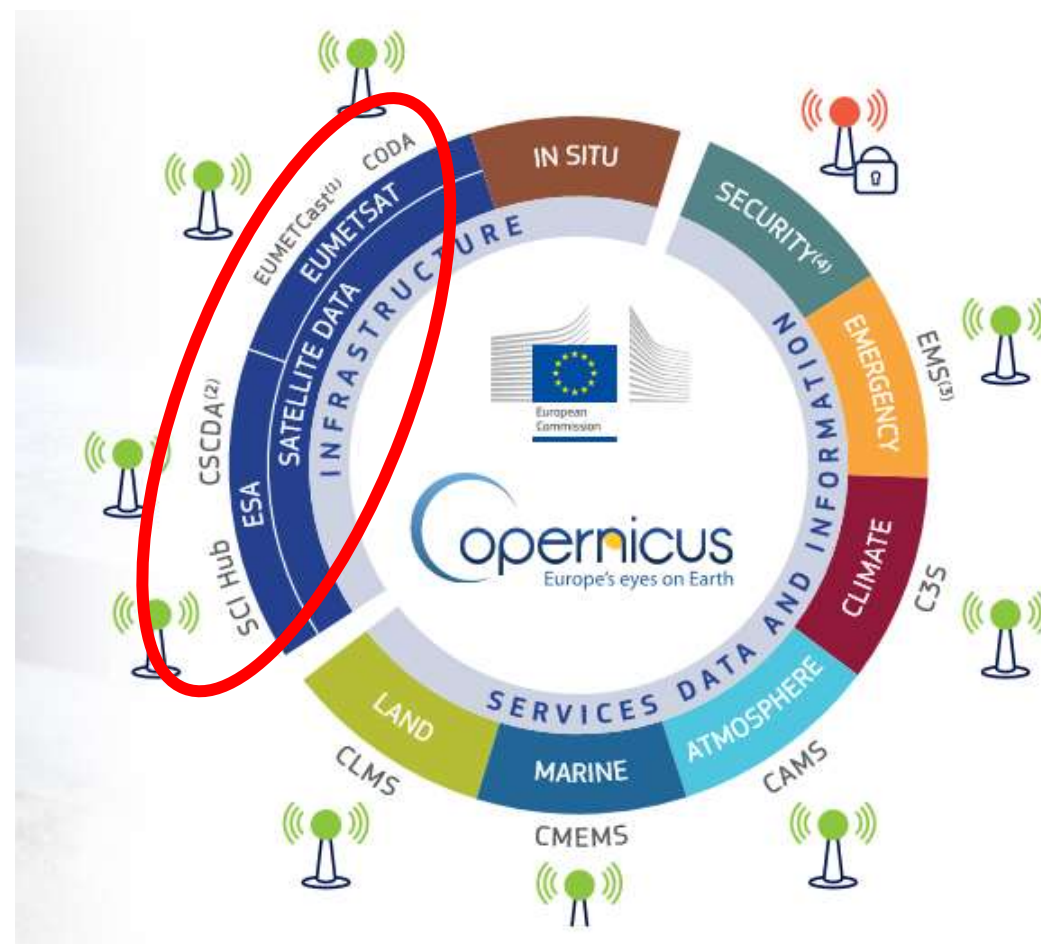


COPERNICUS ONLINE DATA ACCESS

EUMETSAT DATA CENTRE



- Registration required
- Anyone can register
- User Guide available
- Data sets with different access rights
- Environmental data
- Can be accessed with EO Portal account
- Data archives and online access
- Youtube Tutorials – how to access and to visualise Copernicus data



Copernicus Open Access Portal

Image Capture

- <https://scihub.copernicus.eu/> Online user guide is available
- The Sentinel-1 data offer for the Open Access Hub consists of:
 - Level-0 and Level-1 user products for the following acquisition modes:
 - Strip Map (SM)
 - Interferometric Wide Swath (IW)
 - Extra Wide Swath (EW)
 - Level-2 user products for the following acquisition modes:
 - Wave (WV)
 - Interferometric Wide Swath (IW)
 - Extra Wide Swath (EW)
- The Sentinel-2 data offer consists of Level-C and level-A user products

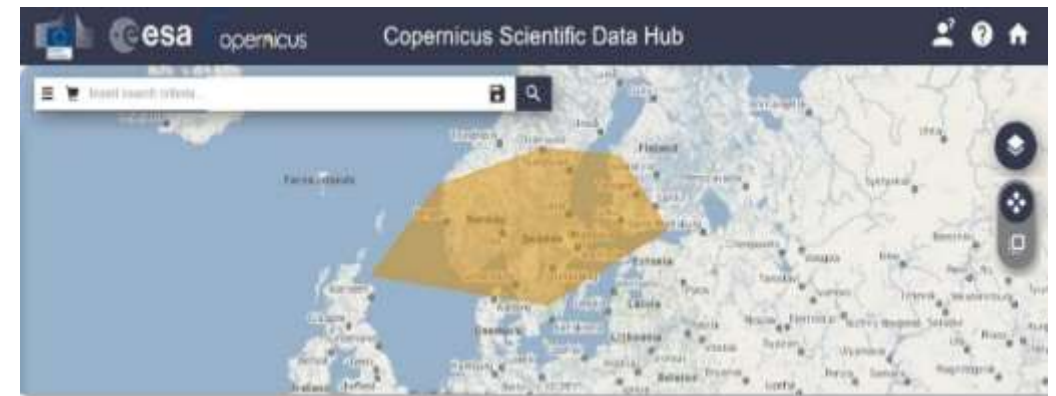
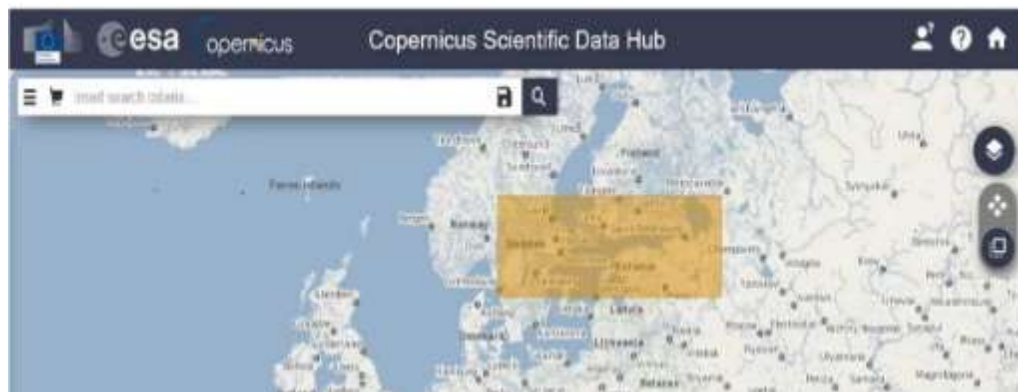
- The Sentinel-3 data offer consists Level-1 and Level-2 **Land** user products for the OLCI, SLSTR and SRAL instruments. Please note that, being Sentinel-3 a joint ESA and EUMETSAT mission, L1 products and L2 **Marine** products are made available to users by EUMETSAT.
 - The Sentinel-5P data offer for the Open Access Hub will consist of Level-1B and Level-2 user products for the TROPOMI instrument.
- The Open Access Hub maintains an online archive for **1 year** of data for immediate download. Older products are available to order from their Long Term Archive (LTA) on-line archive and can be made available within 24 hours
 - API available through the same website

IMAGE Capture

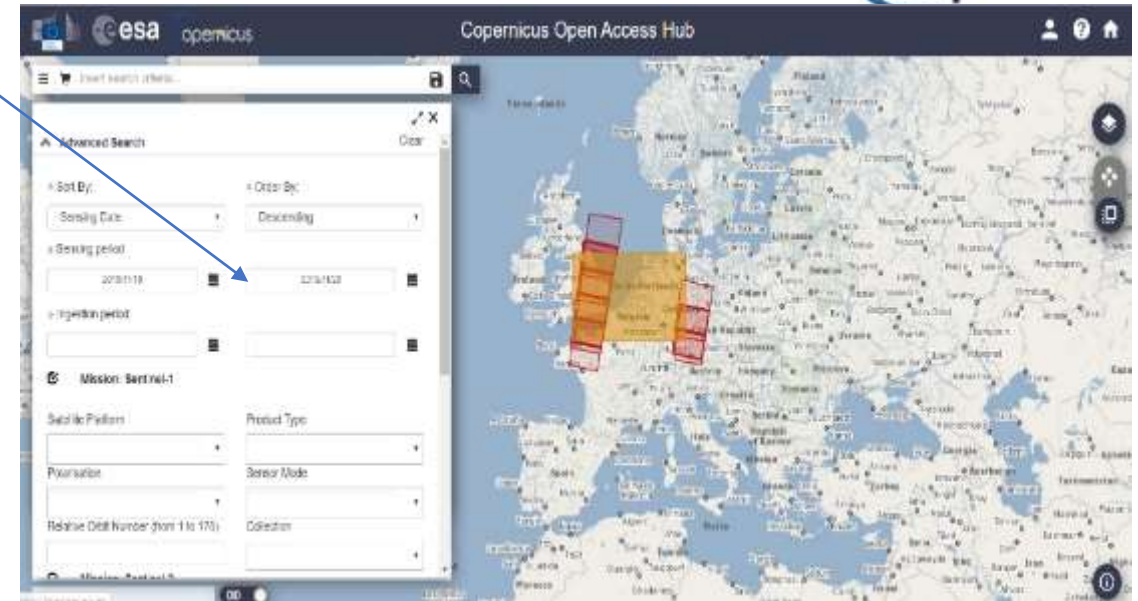
- 1: Register on the website
2. Search panel provides a *'full text search bar'*, *'advanced search options'* and a *'map tool'*.



- The map tool provides a geographical search feature for defining an Area of Interest (AoI) either in the shape of a box or of a polygon.
- Users will be able to search on the Map Layer either in Navigation Mode or Area Mode: Click on this Icon to switch from one mode to the other.



- Find and select your instrument and specify date range



- Search results – show no. of pages and products



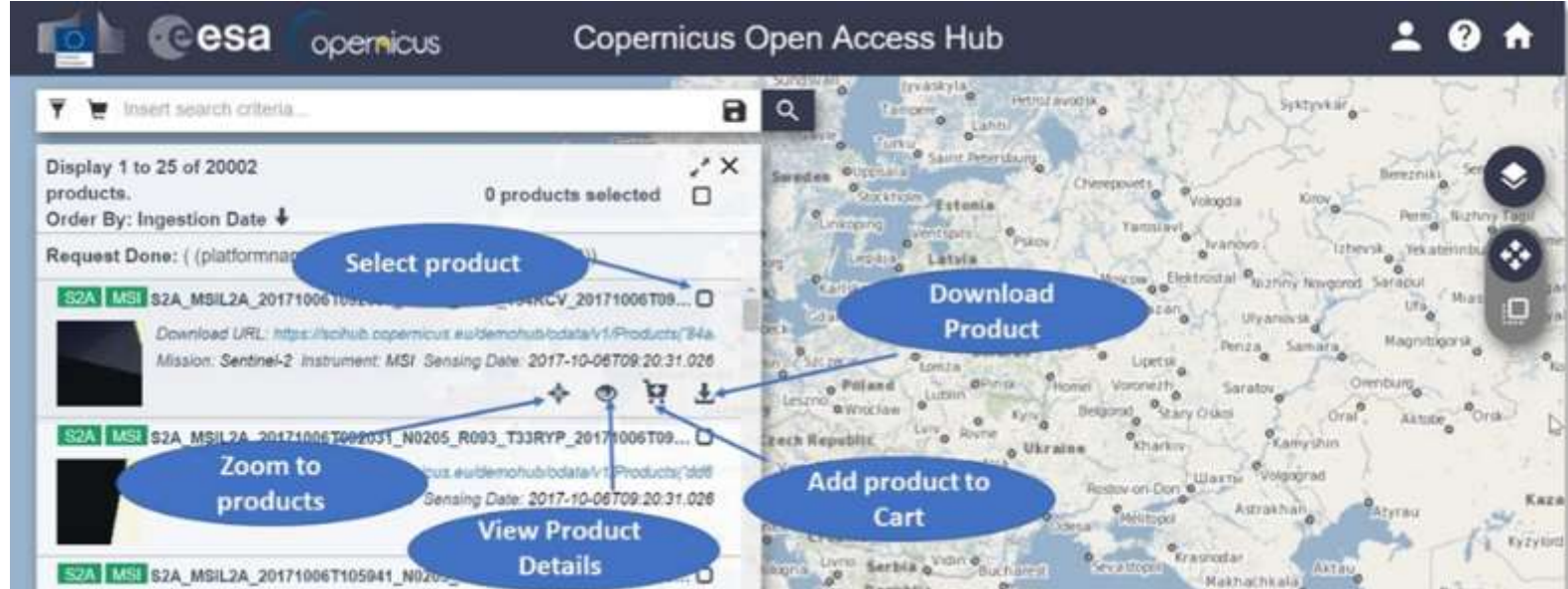
You can also save your search so it is quicker to load if you ever need it again at a later date.



3. Download Product

The following options are available for each product displayed in the search list:

- Select product
- Zoom to product
- View Product Details
- Add product to Cart
- Download Product

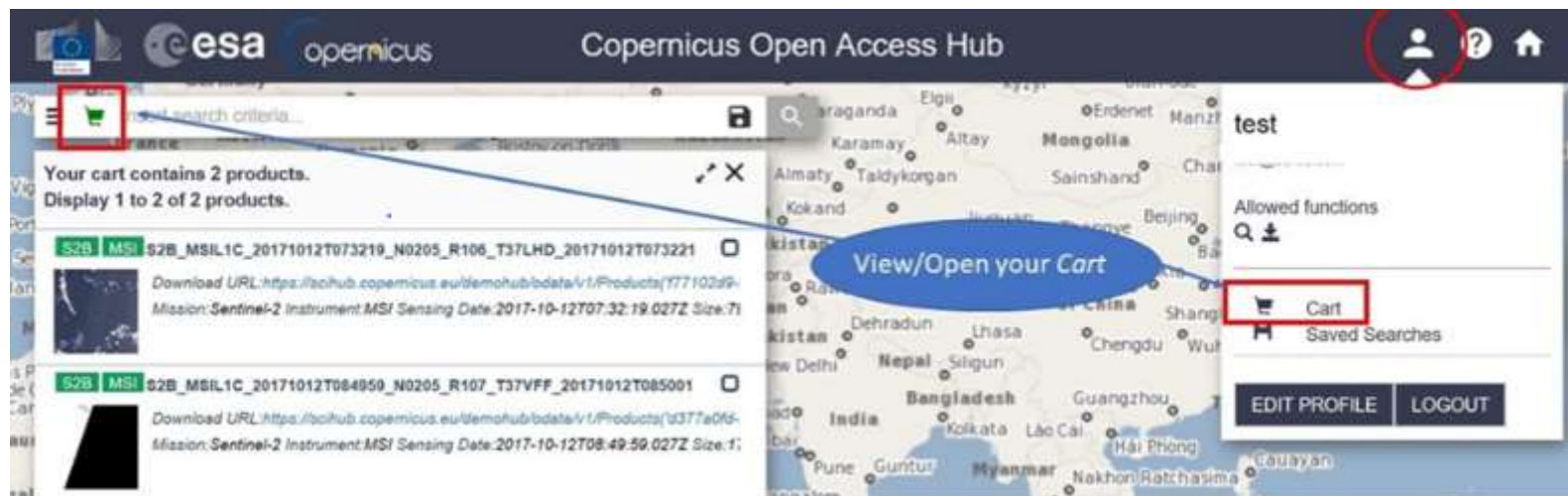


The Open Access Hub provides a **Cart** that can contain a number of products.

The **Cart** can be opened either by the *Full Text Bar* or from the *User Profile Icon*

Click on user profile to get to the cart

To perform a single download click on the Download button icon associated to each product



You can add up to 100 files/images to the 'cart' and download them all at the end in one go using a third party download manager tool, e.g. https://en.wikipedia.org/wiki/Comparison_of_download_managers

Data Access

Imagery

✓ **Data and processing**

Services: data and information, forecasts...

Data Access and Processing Research & User Support for Sentinel Core products



rus-copernicus.eu

- Training sessions, workshops, webinars
- Access to expert support teams



Recorded webinars

e.g. Air Quality monitoring with
Sentinel-5P ([link](#))



Data Access and Processing

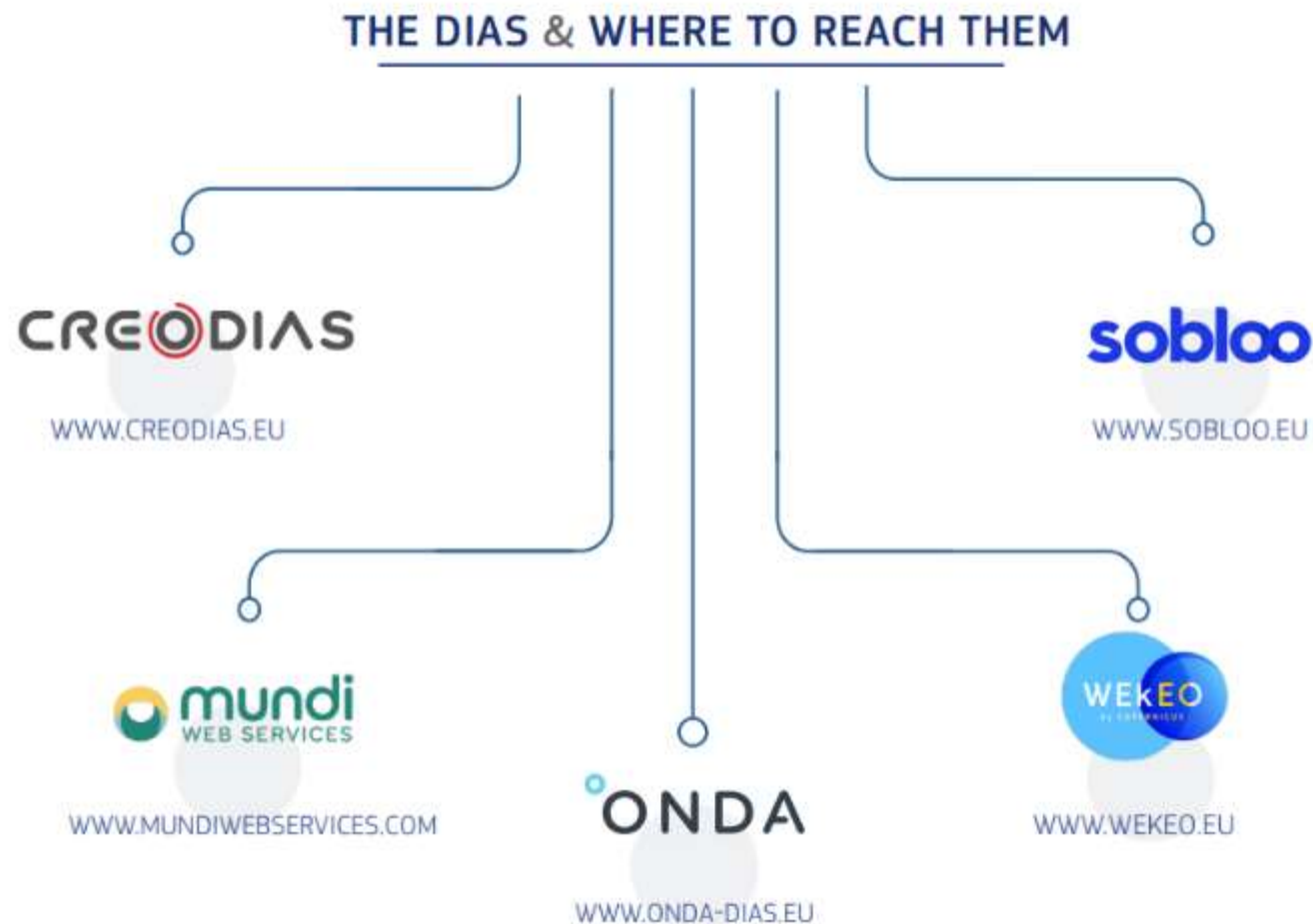
5 DIASes – Data Access and Information Services

- Access to all Copernicus data and information collocated with computing resources
- Big Data analytics without the need to download the data and information
- Data fusion with non-EO data and information

Data Access and Processing

5 DIASes

- 5 competitive platforms
- All provide access to Copernicus Sentinel data, as well as to the information products from Copernicus' six operational services, together with cloud-based tools (open source and/or on a pay-per-use basis)







Data Access and Processing

5 DIASes - WEKEO

WEKEO OUR USERS OFFER DATA DOCS NEWS SUPPORT LOG IN REGISTER

Choose the package that fits your needs

| | Essential | Advanced | Federated |
|---|--|--|--|
|  <p>COPERNICUS DATA Discover, view and download data</p> | Try it <input checked="" type="checkbox"/> | Try it <input checked="" type="checkbox"/> | Contact us <input type="checkbox"/> |
|  <p>CLOUD-BASED PROCESSING & TOOLS Transform Copernicus data into your own specific services and promote them</p> | <input type="checkbox"/> | Try it <input checked="" type="checkbox"/> | <input type="checkbox"/> |
|  <p>USER SUPPORT Benefit from skilled technical and customer support.</p> | Try it <input checked="" type="checkbox"/> | Try it <input checked="" type="checkbox"/> | <input type="checkbox"/> |
|  <p>EXPAND YOUR OFFER TO YOUR USERS Share your data or infrastructure with WEKEO and expand your offer in return.</p> | <input type="checkbox"/> | <input type="checkbox"/> | Contact us <input checked="" type="checkbox"/> |

We've found 88 results


[Make this an extended search](#)


Preview · [Download Data](#)

The **Water** Bodies or WB product detects the areas covered by inland **water** across the globe, providing the maximum and the minimum extent of the **water** surface as well as the seasonal dynamics. The area of **water** bodies is identified as an Essential Climate Variable (ECV) by the Global Climate Observing System (GCOS).

[Water quality indicator for European rivers](#)



Preview · [Download Data](#)

Water quality indicators for European rivers. **Water** quality indicators: Phosphorous concentrations and loads, nitrogen concentrations and loads, **water** temperatures Available **water** quality indicators are: Phosphorous concentrations (catchment) Phosphorous loads (catchment) Nitrogen concentrations ...

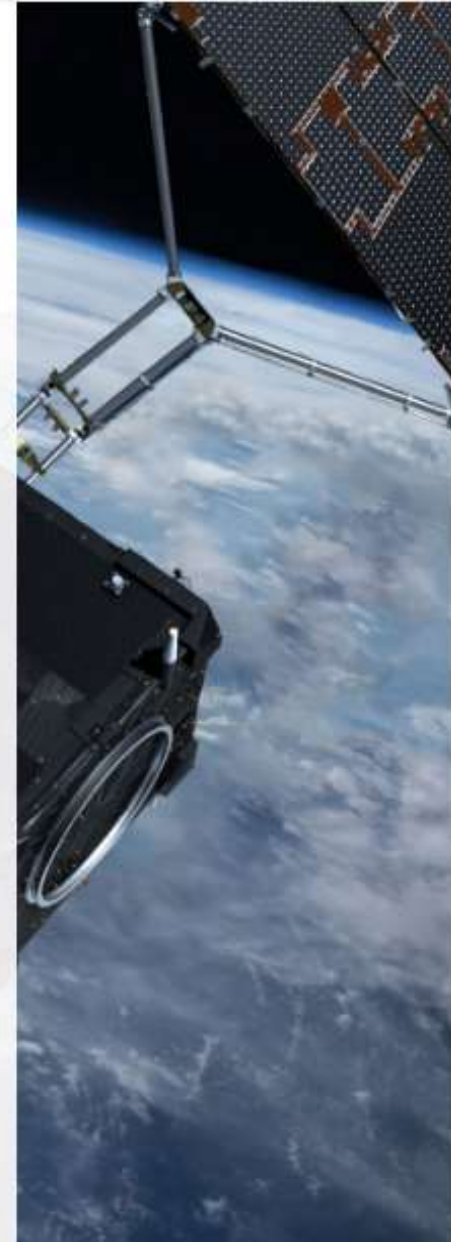
[Water quantity indicators for European catchments](#)



Preview · [Download Data](#)

Water quantity indicators for European catchments. This dataset contains data related to flood recurrences, flow duration curve, river flow, snow **water** equivalent, soil **water** content, runoff and wetness. The datasets was developed as part of a proof of concept contract. The indicators were co-designed with a set of user representatives to simplify the climate-change ...

10 daily **Water** Bodies over Africa 1km; Continents



Data Access and Processing

5 DIASes - ONDA

www.onda-dias.eu

ONDA is a platform enabling users to host data and to build their applications in the Cloud.



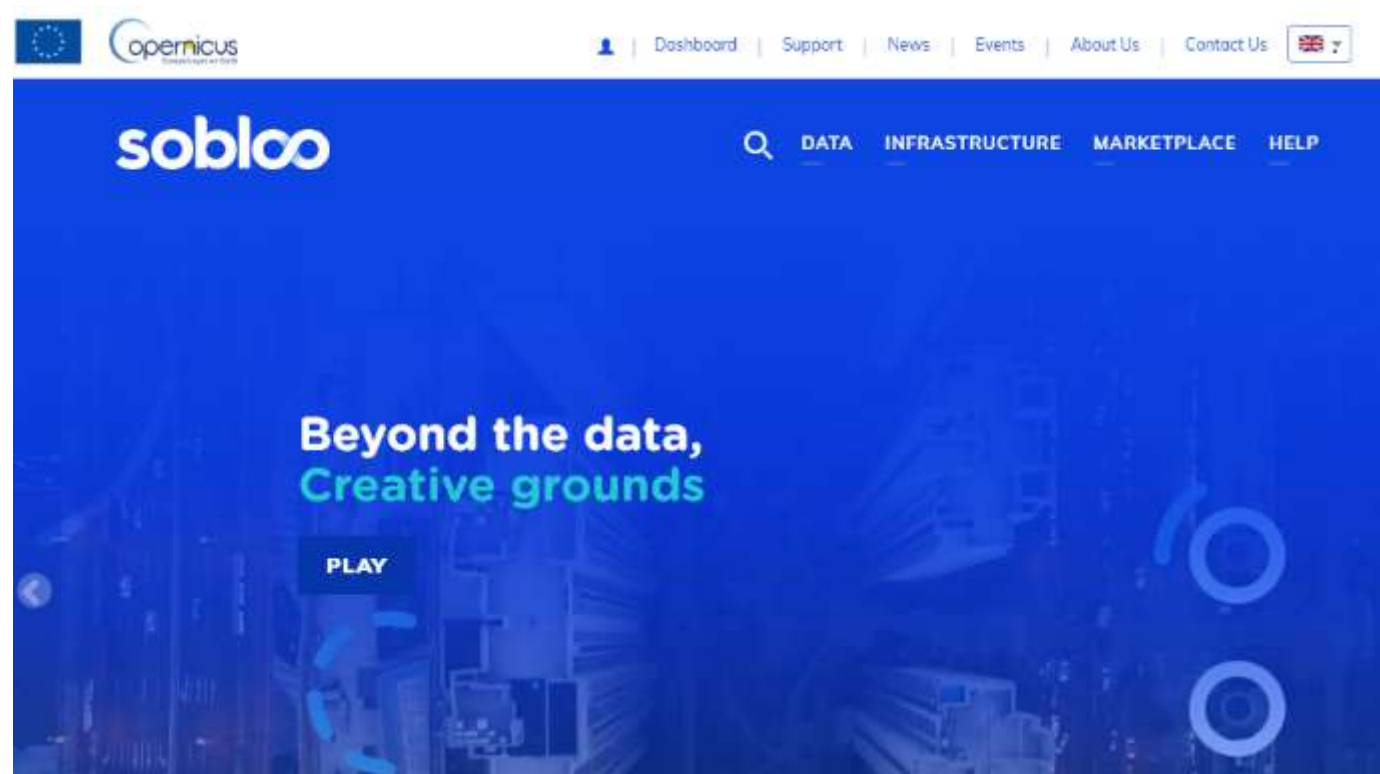
Data Access and Processing

5 DIASes - SOBLOO

www.sobloo.eu

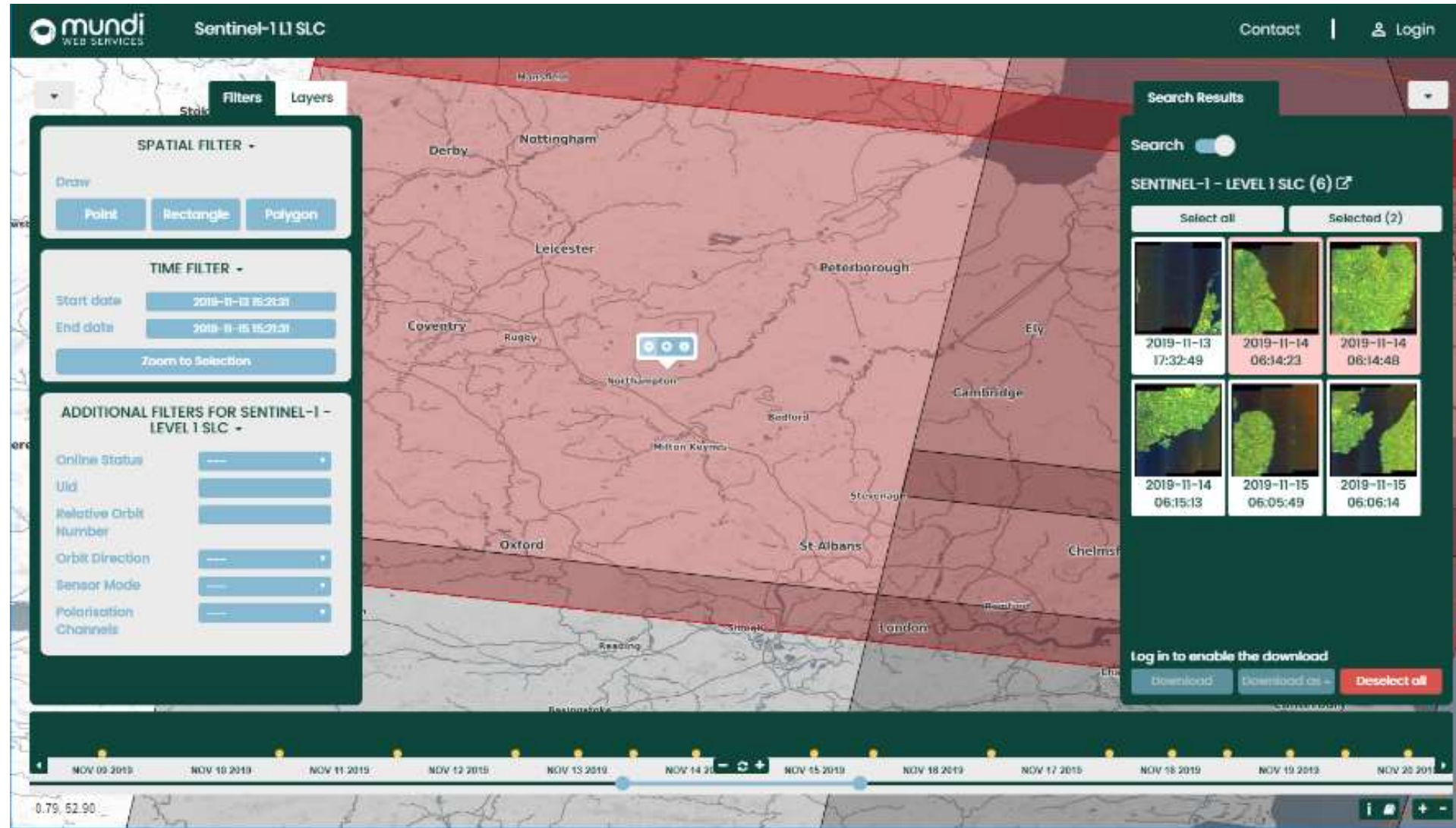
From raw satellite imagery or data collections to value-added information.

A large selection of information and tools that can help you make informed decisions and develop new services.



Data Access and Processing

5 DIASes - MUNDI



The screenshot displays the MUNDI web interface for Sentinel-1 SLC data. The interface includes a search bar, filters, and a map view. The filters are categorized into Spatial, Time, and Additional filters. The search results panel shows a grid of satellite imagery thumbnails with their respective acquisition times. The map view shows a geographical area with a red overlay indicating the search area. The interface also includes a timeline at the bottom and a 'Log in to enable the download' prompt.

mundi Sentinel-1 SLC

Contact | Login

Filters Layers

SPATIAL FILTER -

Draw

Point Rectangle Polygon

TIME FILTER -

Start date: 2019-11-13 15:21:31

End date: 2019-11-15 15:21:31

Zoom to Selection

ADDITIONAL FILTERS FOR SENTINEL-1 - LEVEL 1 SLC -

Online Status: [dropdown]

Uid: [input]

Relative Orbit Number: [input]

Orbit Direction: [dropdown]

Sensor Mode: [dropdown]

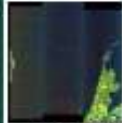





Polarisation Channels: [dropdown]

Search Results

Search: [toggle]

SENTINEL-1 - LEVEL 1 SLC (6)

Select all Selected (2)

| | | |
|---|---|---|
|  2019-11-13 17:32:49 |  2019-11-14 06:14:23 |  2019-11-14 08:14:48 |
|  2019-11-14 06:15:13 |  2019-11-15 06:05:49 |  2019-11-15 06:06:14 |

Log in to enable the download

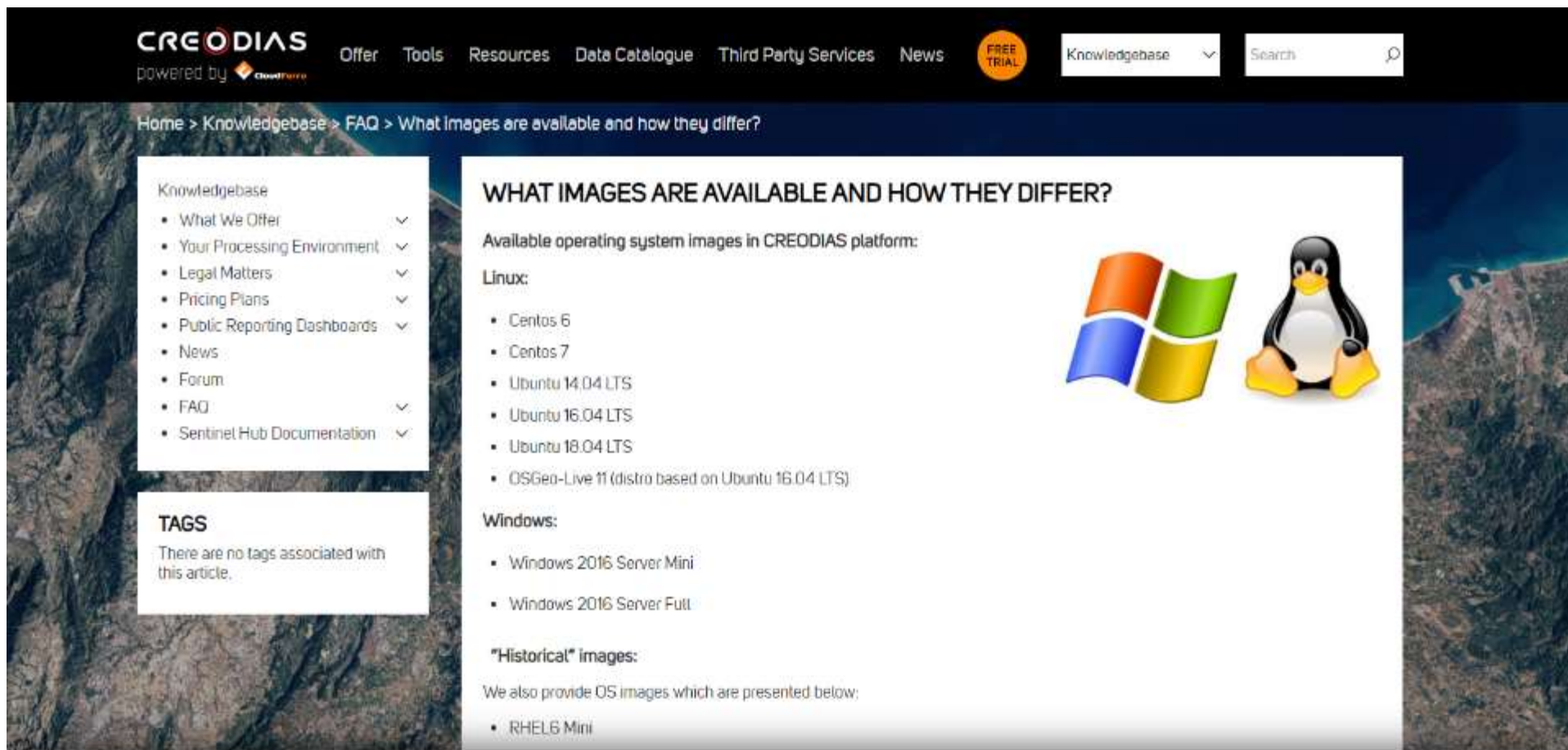
Download Download as Deselect all

NOV 09 2019 NOV 10 2019 NOV 11 2019 NOV 12 2019 NOV 13 2019 NOV 14 2019 NOV 15 2019 NOV 18 2019 NOV 17 2019 NOV 16 2019 NOV 19 2019 NOV 20 2019

0.79, 52.90

Data Access and Processing

5 DIASes - CREODIAS



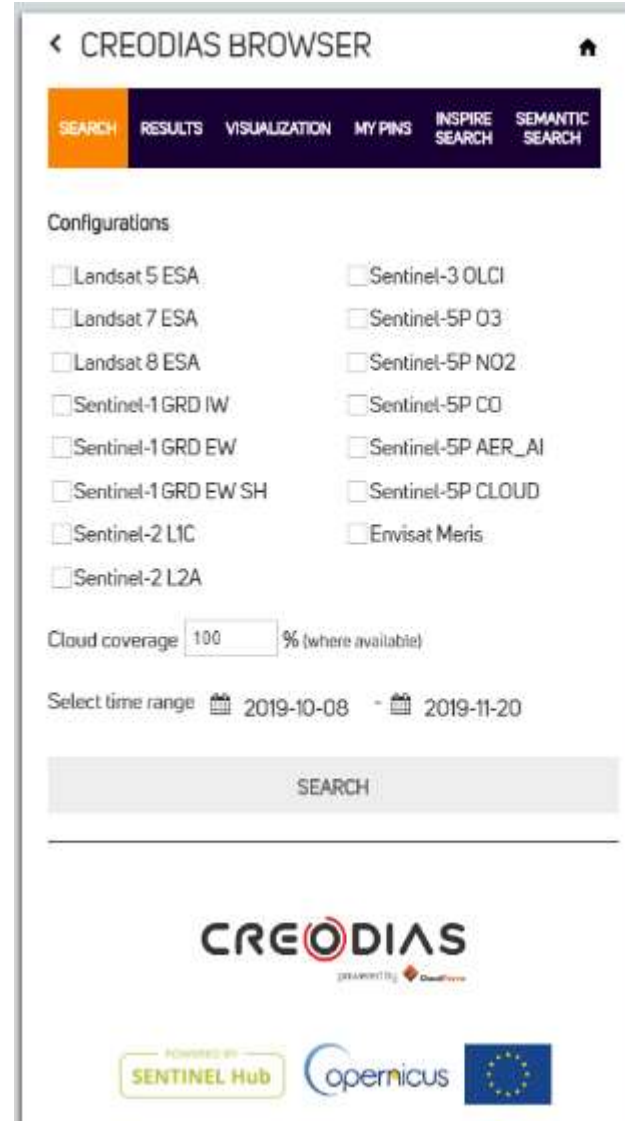
The screenshot shows the CREODIAS website interface. At the top, there is a navigation bar with the CREODIAS logo (powered by CloudPave), menu items (Offer, Tools, Resources, Data Catalogue, Third Party Services, News), a 'FREE TRIAL' button, a 'Knowledgebase' dropdown, and a search box. The breadcrumb trail reads: Home > Knowledgebase > FAQ > What Images are available and how they differ? On the left, a Knowledgebase sidebar lists various categories like 'What We Offer', 'Your Processing Environment', 'Legal Matters', 'Pricing Plans', 'Public Reporting Dashboards', 'News', 'Forum', 'FAQ', and 'Sentinel Hub Documentation'. Below this is a 'TAGS' section stating 'There are no tags associated with this article.' The main content area features the article title 'WHAT IMAGES ARE AVAILABLE AND HOW THEY DIFFER?' and a sub-heading 'Available operating system images in CREODIAS platform:'. It lists two categories: 'Linux' and 'Windows'. The Linux section includes icons for Windows and Linux (Tux penguin) and lists: Centos 6, Centos 7, Ubuntu 14.04 LTS, Ubuntu 16.04 LTS, Ubuntu 18.04 LTS, and OSGeo-Live 11 (distro based on Ubuntu 16.04 LTS). The Windows section lists: Windows 2016 Server Mini and Windows 2016 Server Full. A 'Historical' images section lists: RHEL6 Mini. A note at the bottom states: 'We also provide OS images which are presented below:'.

Data Access and Processing

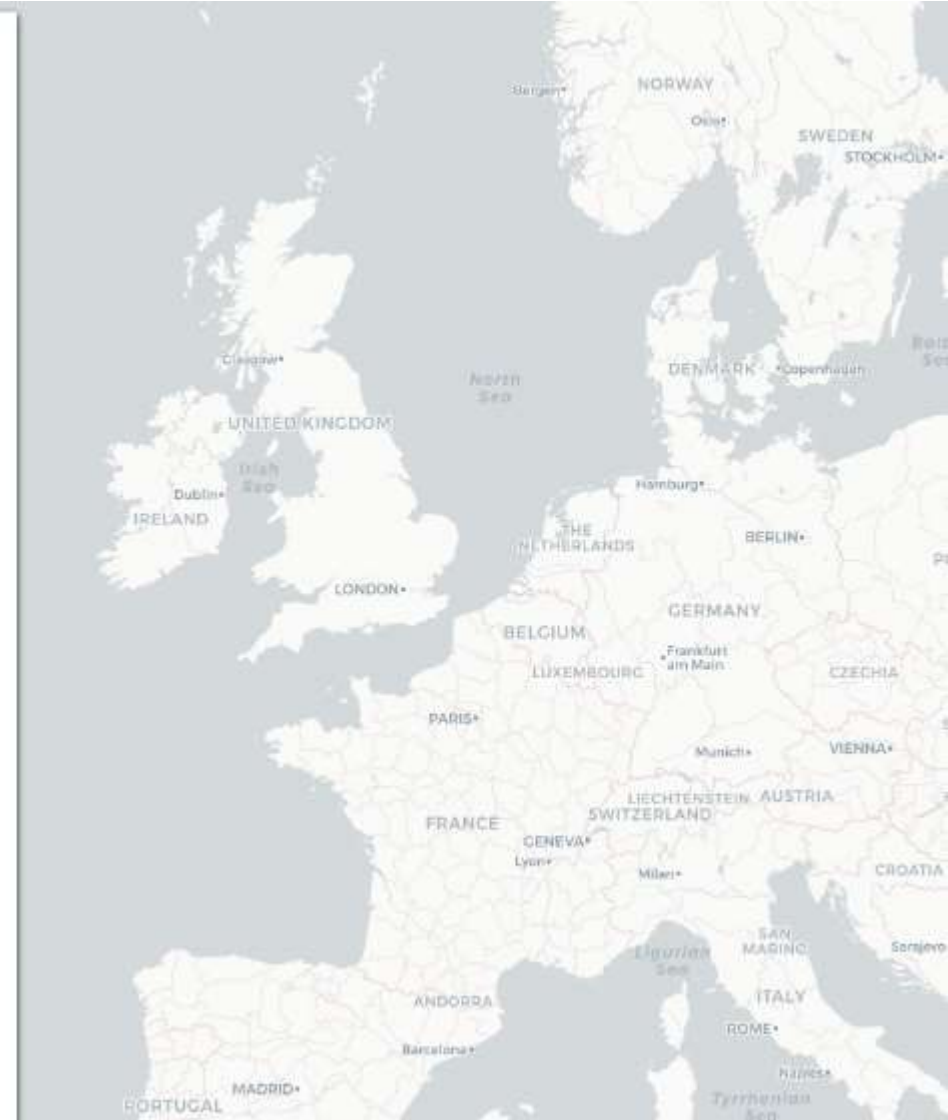
5 DIASes - CREODIAS

Creodias Browser

- Browse
- Visualise
- Download (without registration)



The screenshot shows the CREODIAS BROWSER interface. At the top, there is a navigation bar with tabs for SEARCH, RESULTS, VISUALIZATION, MY PINS, INSPIRE SEARCH, and SEMANTIC SEARCH. Below this is a 'Configurations' section with a grid of satellite options, each with a checkbox: Landsat 5 ESA, Landsat 7 ESA, Landsat 8 ESA, Sentinel-1 GRD IW, Sentinel-1 GRD EW, Sentinel-1 GRD EW SH, Sentinel-2 L1C, Sentinel-2 L2A, Sentinel-3 OLCI, Sentinel-5P O3, Sentinel-5P NO2, Sentinel-5P CO, Sentinel-5P AER_AI, Sentinel-5P CLOUD, and Envisat Meris. Below the configurations is a 'Cloud coverage' field set to 100% and a 'Select time range' field set to 2019-10-08 to 2019-11-20. A large 'SEARCH' button is positioned below these fields. At the bottom of the interface, the CREODIAS logo is displayed, along with logos for SENTINEL Hub, Copernicus, and the European Union flag.





SEARCH RESULTS **VISUALIZATION** MY PINS INSPIRE SEARCH SEMANTIC SEARCH

Satellite: SENTINEL-2 L1C **L2A**



Date: 2019-11-18



Custom
Create custom rendering



Sentinel 2 - True color
Based on bands 4,3,2



Sentinel 2 - False color
Based on bands 6,4,3



Sentinel 2 - NDVI
Based on combination of bands (B8 - B4)/(B8 + B4)



Sentinel 2 - SWIR
Based on bands 12,8A,4



Sentinel 2 - NDWI
Based on combination of bands (B3 - B8)/(B3 + B8)

Download image

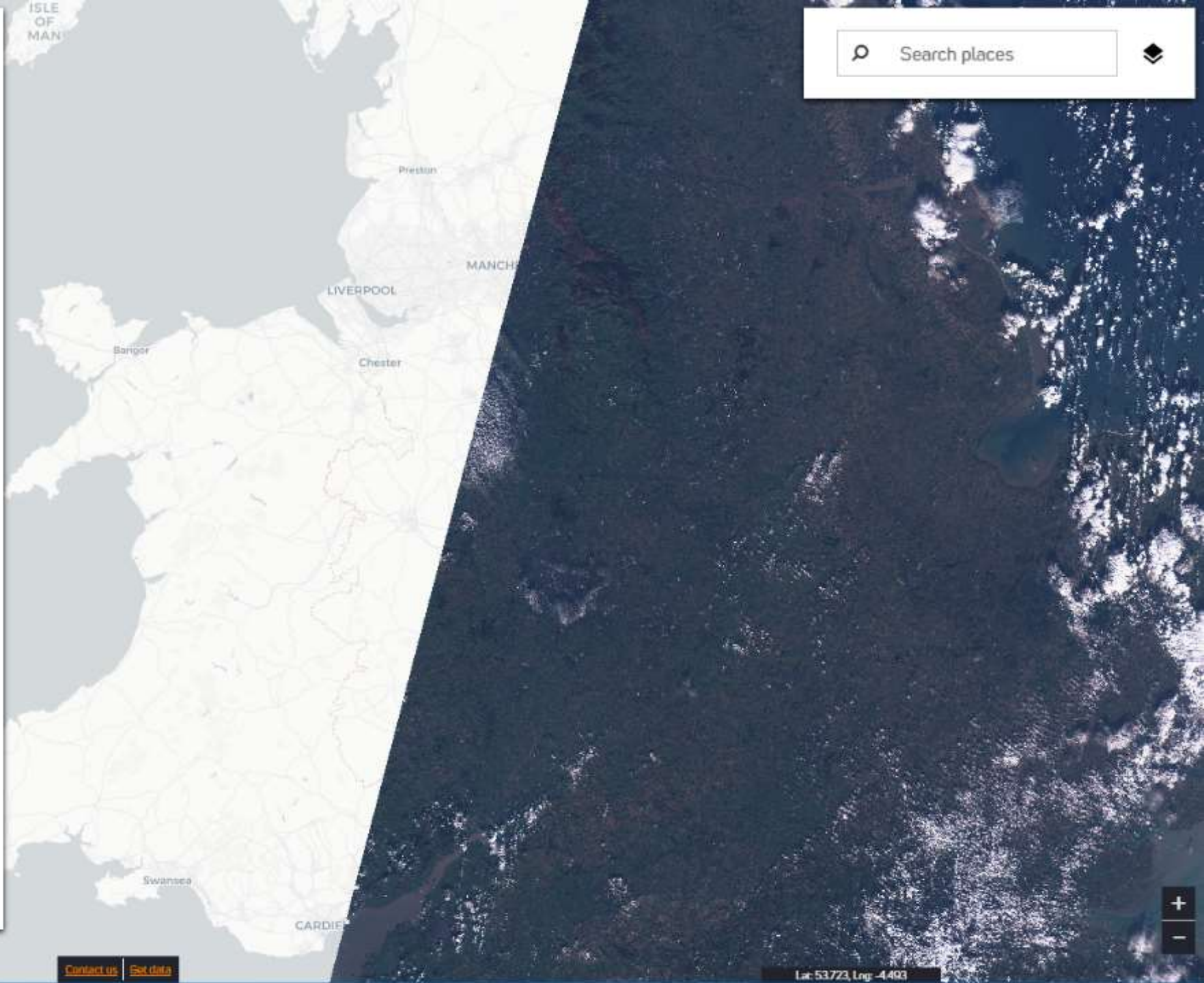
CREODIAS
powered by

POWERED BY
SENTINEL Hub

Copernicus



Search places



Lat: 53.723, Long: -4.493

[Contact us](#) | [Get data](#)

30 km

Data access and processing

Other platforms

ESA thematic exploitation platforms

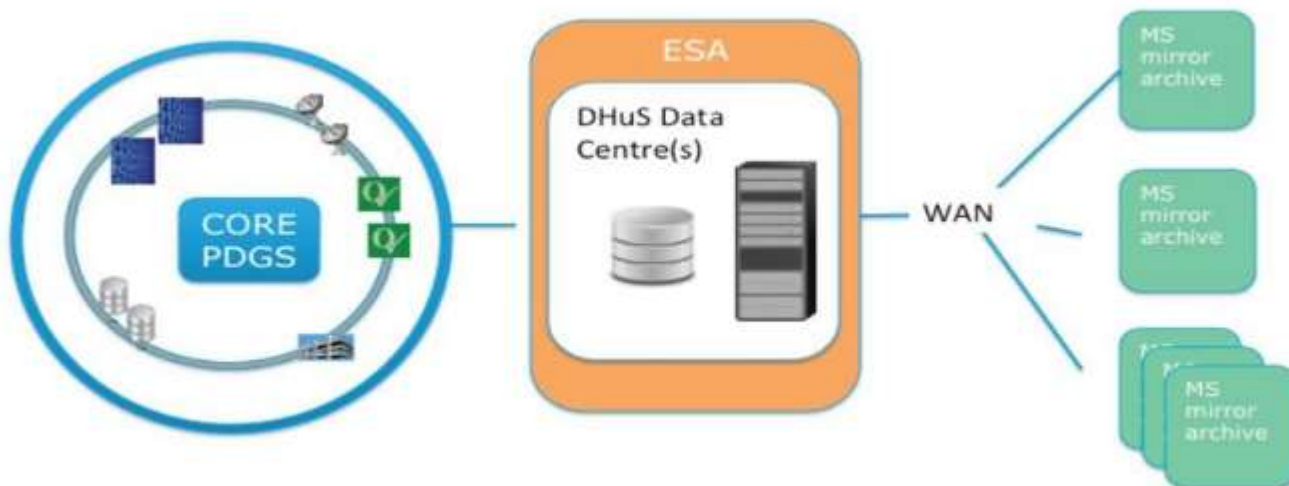
- [Coastal](#)
- [Forestry](#)
- [Geohazards](#)
- [Hydrology](#)
- [Polar](#)
- [Urban](#)
- [Food security](#)
- ...



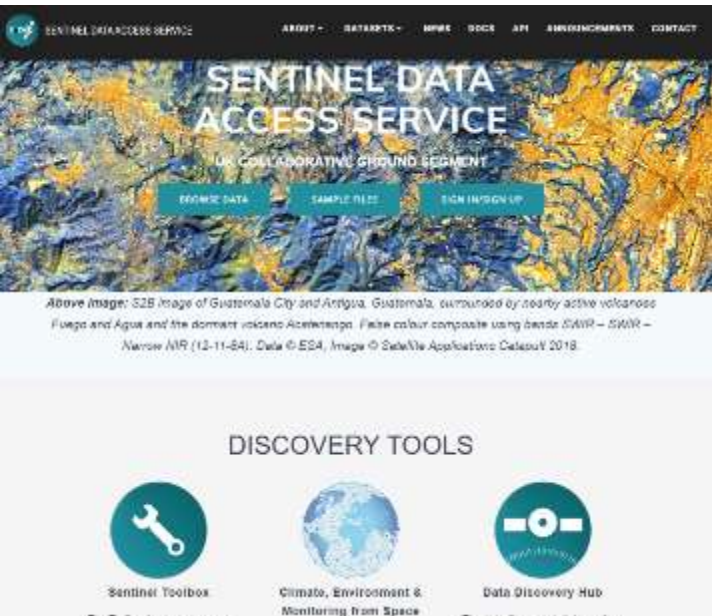
<https://tep.eo.esa.int/>

Data access and processing

Other platforms



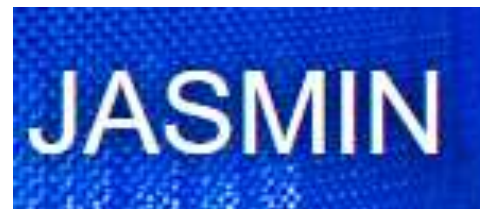
Collaborative ground segments are connected with ESA's core ground segment through a dedicated hub (DHuS) over a fast network (WAN), which gives near real time access to core products. Collaborative ground segments can establish mirror archives to secure fast data access for national end-users to both new and historical image datasets (figure from ESA, 2013).



Sentinel Data Access Service



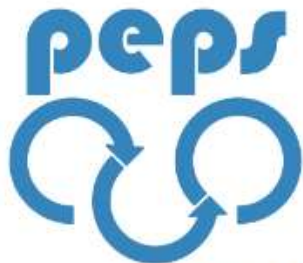
<https://sedas.satapps.org/>



<http://www.jasmin.ac.uk/>



<https://peps.cnes.fr/rocket/#/home>



FRENCH ACCESS TO THE SENTINEL PRODUCTS



<https://www.theia-land.fr/en/products/>



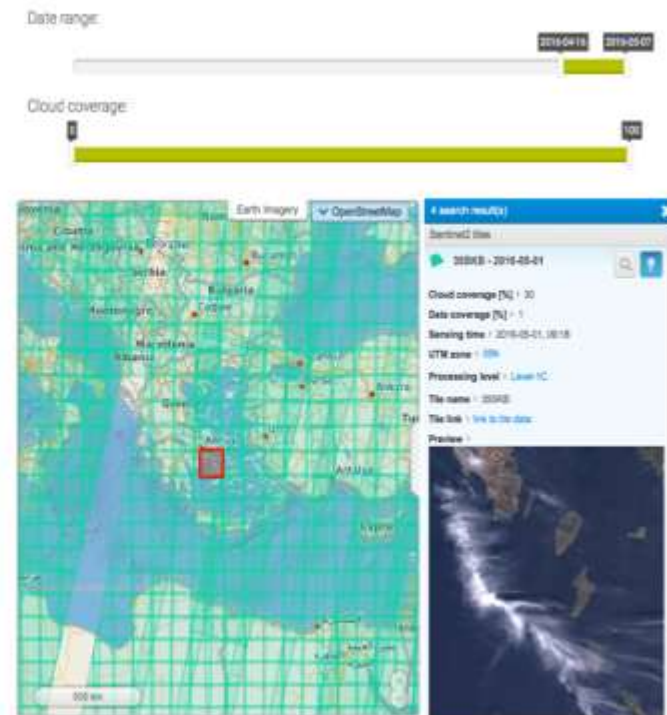
<https://sentinels.space.noa.gr/>



Data access and processing Amazon & Google Earth

- **Amazon Simple Storage Service (Amazon S3)** is a service providing object storage through a web service interface. Access to Sentinel data is free, full and open for the broad community. New Sentinel data are added regularly, usually within few hours after they are available on Copernicus OpenHub. The service is managed by Sinergise.

<https://registry.opendata.aws/sentinel-2/>



Data access and processing Amazon & Google Earth

- **Sentinel-5P Level 2 - AWS**
- This data set consists of observations from the Sentinel-5 Precursor (Sentinel-5P) satellite of the European Commission's Copernicus Earth Observation Programme. Sentinel-5P is a polar orbiting satellite that completes 14 orbits of the Earth a day. It carries the TROPospheric Monitoring Instrument (TROPOMI) which is a spectrometer that senses ultraviolet (UV), visible (VIS), near (NIR) and short wave infrared (SWIR) to monitor ozone, methane, formaldehyde, aerosol, carbon monoxide, nitrogen dioxide and sulphur dioxide in the atmosphere. The satellite was launched in October 2017 and entered routine operational phase in March 2019. Data is available from July 2018 onwards. Updated daily.
- Managed by [Meteorological Environmental Earth Observation](#) company

<https://registry.opendata.aws/sentinel5p/>



Resources on AWS

Description

Sentinel-5p Near Real Time Data (NRTI). NetCDF format.

Resource type

S3 Bucket

Amazon Resource Name (ARN)

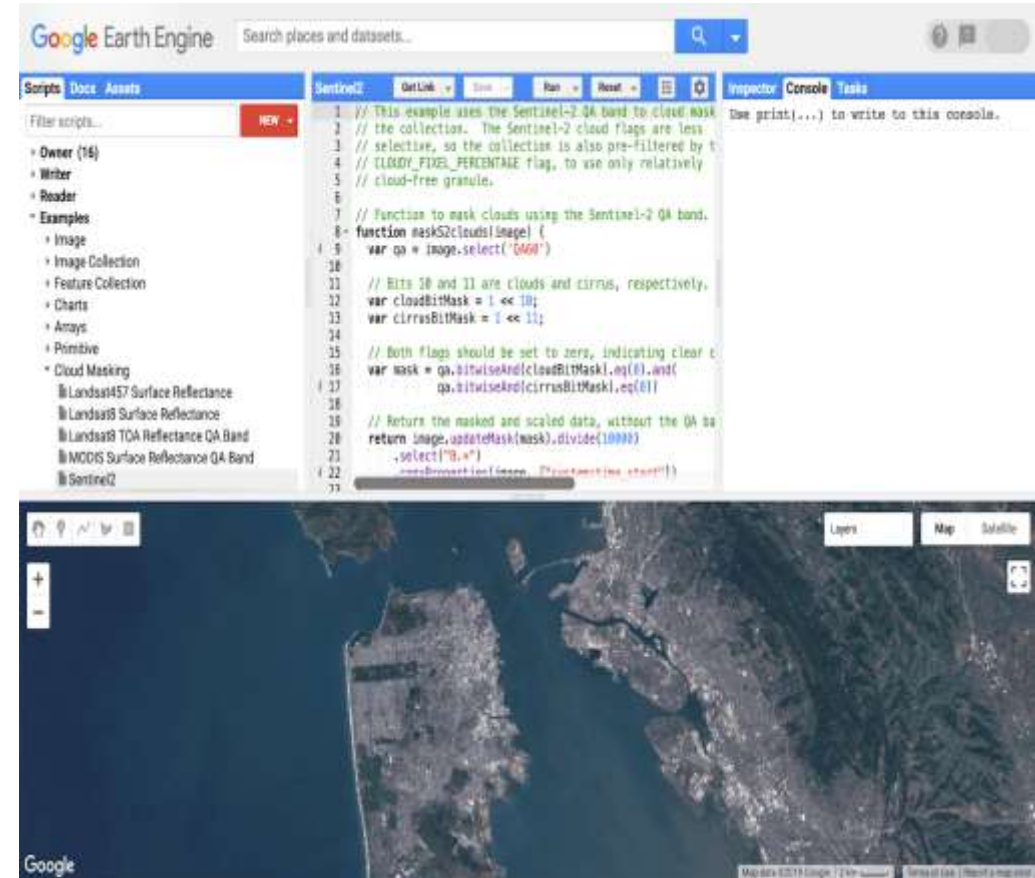
`arn:aws:s3:::meeo-s5p/NRTI/`

AWS Region

`eu-central-1`

Data access and processing Amazon & Google Earth

- **Google Earth Engine** is the most advanced cloud-based geospatial processing platform in Google infrastructure for planetary-scale environmental data analysis. Access to Sentinel data and others is free, full and open.
<https://earthengine.google.com/>
<https://developers.google.com/earth-engine/datasets/catalog/sentinel/>



Data Access

Imagery

Data and processing

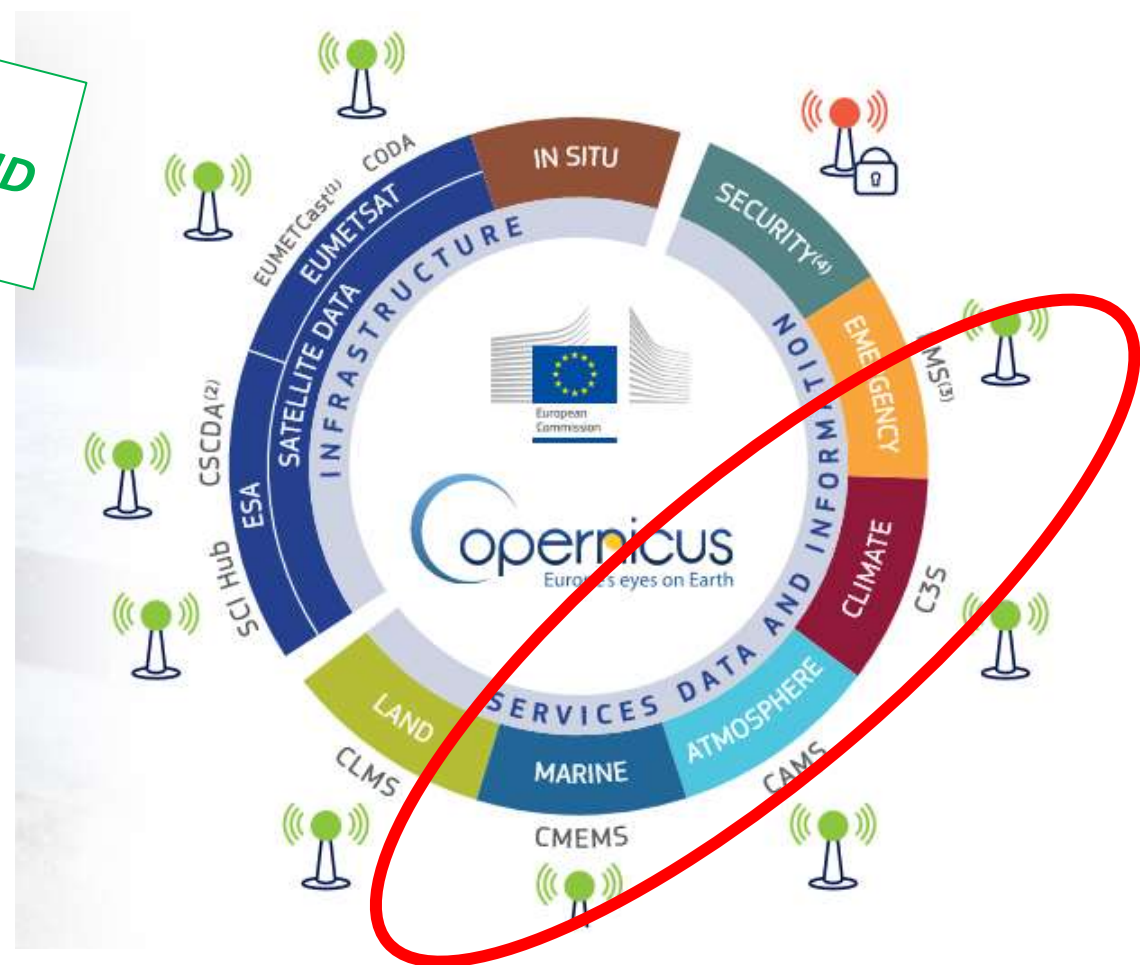
✓ **Services: data and information, forecasts...**

Data Access – Information and services

Access to Copernicus Services Data

- Land-related data:
<http://land.copernicus.eu>
- Atmosphere-related data:
<http://atmosphere.copernicus.eu>
- Marine-related data:
<http://marine.copernicus.eu>
- Emergency-related data:
<http://emergency.copernicus.eu>
- Climate change-related data:
<http://climate.copernicus.eu> (Beta version)

**FULL,
FREE AND
OPEN**



Data access – Information and services

Land service

- <https://land.copernicus.eu/>



Global



Pan-European



Local



Imagery and reference data

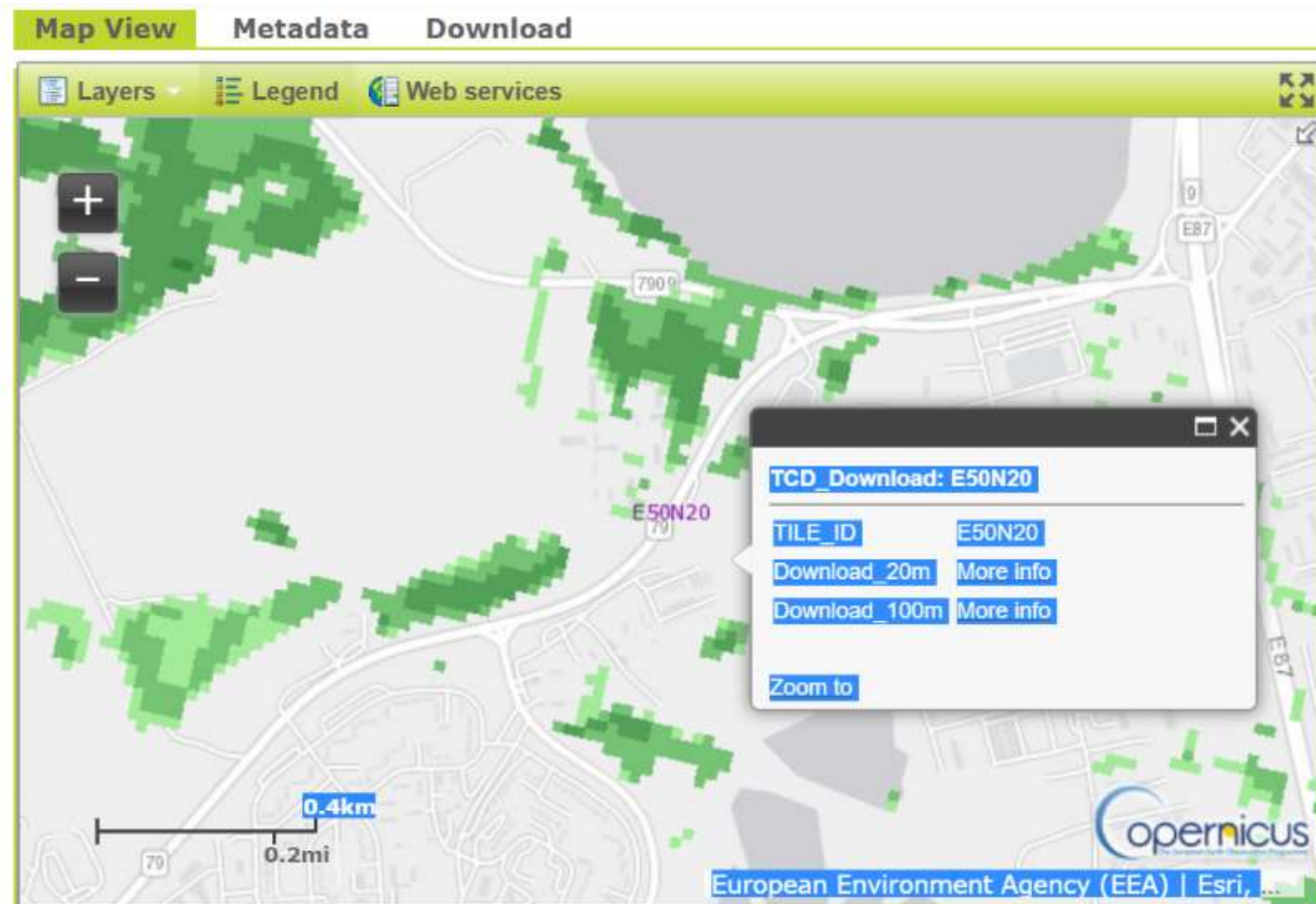
Data access – Information and services

Land service



Local

Tree cover density - 2015



Data access – Information and services

Atmosphere Monitoring service

- <https://atmosphere.copernicus.eu/>

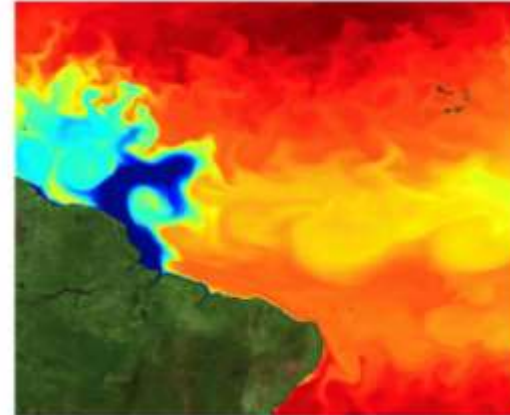
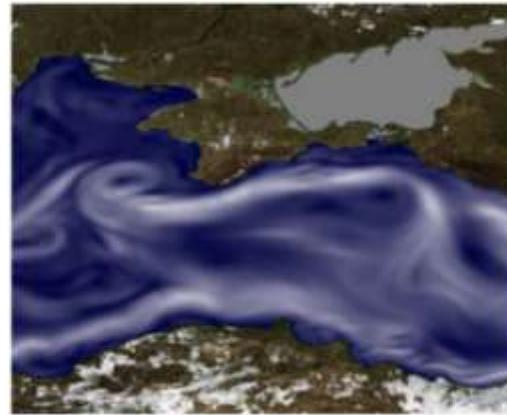
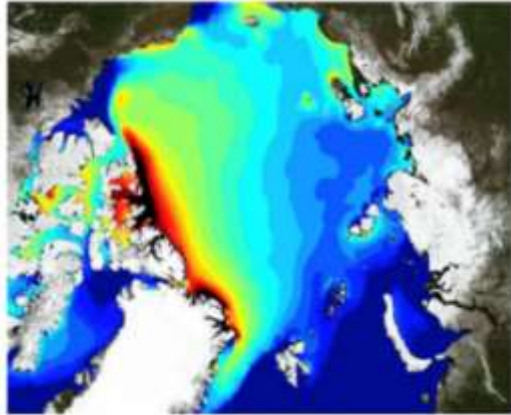


- Using satellite data and ground-based observations with forecast models
- Provide consistent information on the atmosphere
 - Air quality information
 - Air composition, ozone layer and UV radiation, etc..

Data access – Information and services

Marine Environment Monitoring service

<https://marine.copernicus.eu/>



Examples of products

- Relies on data from various satellites as well as numerical models, but also on *in situ* monitoring networks

Data access – Information and services

Emergency Management service

<https://emergency.copernicus.eu/>

- Providing information for emergency response in relation to different types of disasters
 - European and Global flood awareness system
 - European Forest Fire Information system
 - Drought observatory
- Standardised products: first estimate product, delineation products, grading products, etc.
- Rapid mapping

Data access – Information and services Climate change service (C3S)



<https://climate.copernicus.eu/>



- Climate bulletins and data sets
 - Monthly summaries for surface air temperature, sea ice maps, hydrological variables..
 - Observations, Essential Climate Variables, Seasonal forecasts, climate projections
- Climate Data Store



In conclusion...

... and they are all evolving and new arriving..

Imagery

EO Browser, Land viewer, ...

**Data from different
instruments
and processing**

Open Access portal

DIASes

ESA platforms

National Mirror sites

Google Earth and Amazon

**Services: data and
information, forecasts...**

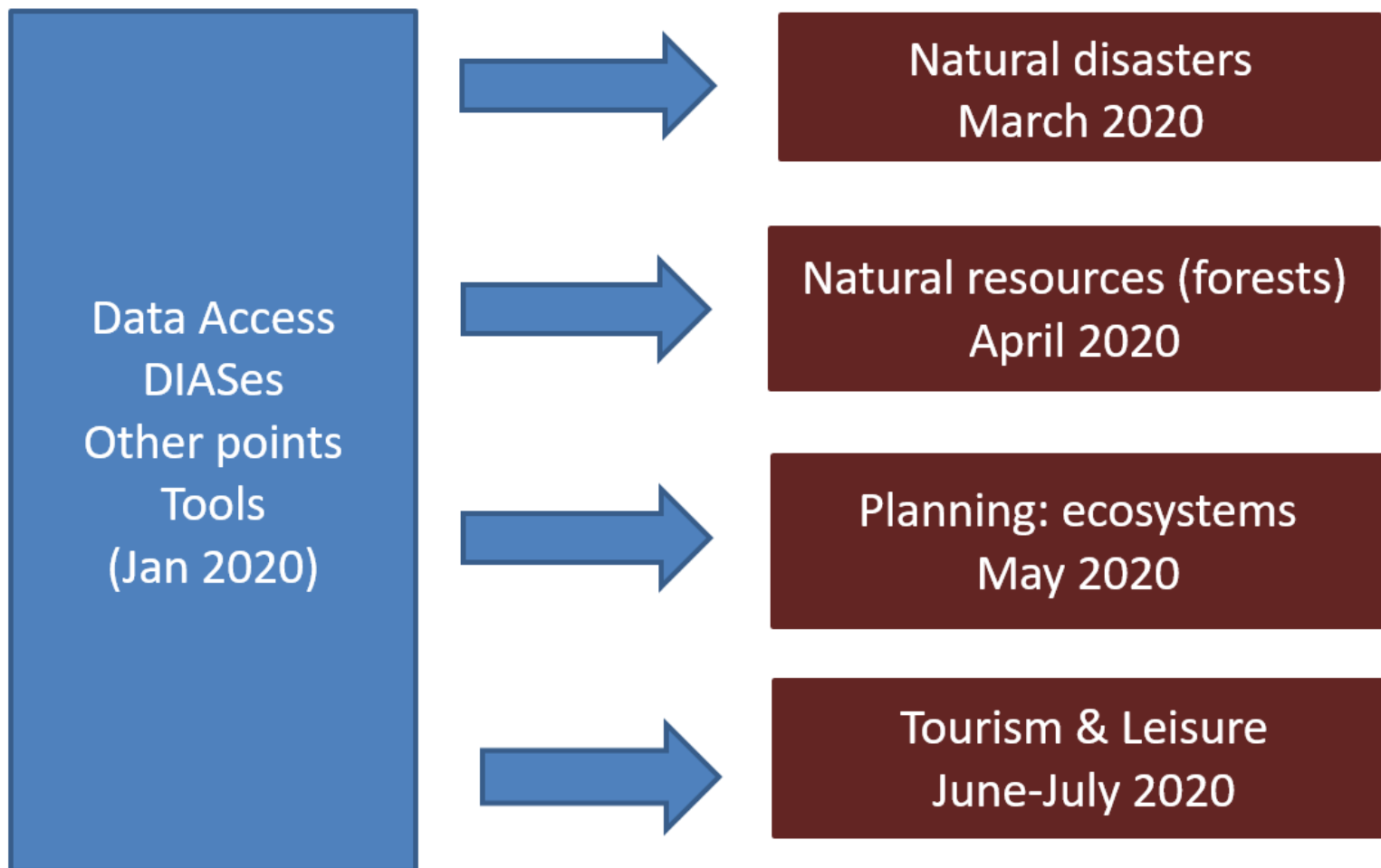
Copernicus services

Questions

- Which access points your users tend to use?
- Which features they find most useful?
- What is it that they want to know about data access?
- Would you like to share your experience in one of our future webinars?

<https://www.surveymonkey.co.uk/r/J5XVWHG>

Train the trainer webinars



Thank you!

Svetlana Zolotikova
sz63@Leicester.ac.uk

<https://www.surveymonkey.co.uk/r/J5XVWHG>