



Copernicus Global Land

Data Access, Needs and Perspectives for A.I. in Copernicus

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Europe's eyes on Earth

Looking at our planet and its environment

For the ultimate benefit of all European citizens



European
Commission

OBSERVER: Looking into changes in European landscapes with the Copernicus Land Monitoring Service

Uruguay River wetlands contains modified Copernicus Sentinel data (2018), processed by ESA, CC BY-SA 3.0 IGO



Atmosphere



Marine



Land



Climate Change



Security



Emergency

Quick Links



Access to Data and DIAS



Opportunities



Copernicus Academy



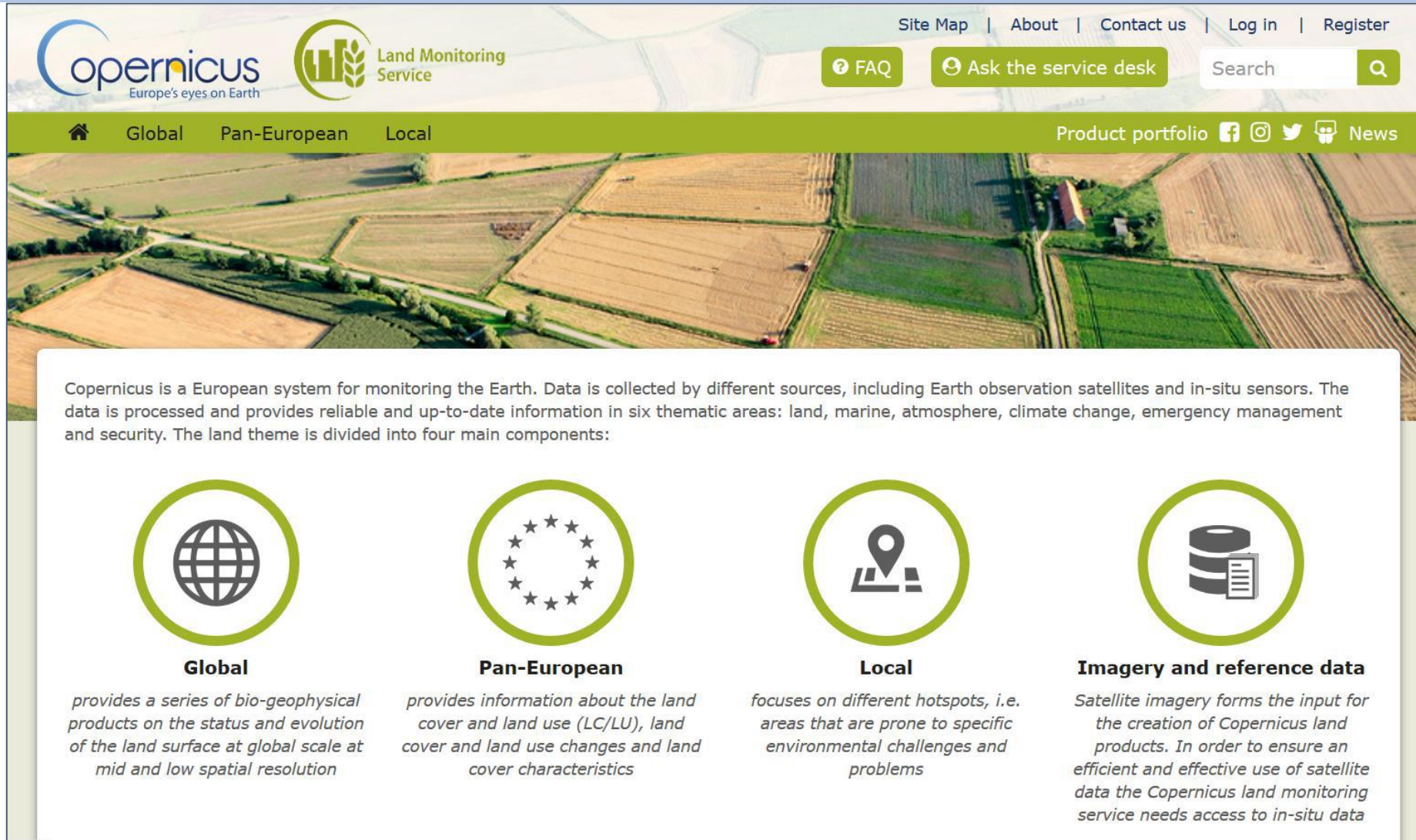
Copernicus Screenshot



Contact and Support

<https://www.copernicus.eu/en/services/land>

Components of the Copernicus Land Service



The screenshot shows the Copernicus Land Monitoring Service website. The header includes the Copernicus logo, the Land Monitoring Service logo, and navigation links: Site Map, About, Contact us, Log in, Register, FAQ, Ask the service desk, and a search bar. A green navigation bar contains links for Global, Pan-European, Local, Product portfolio, and News. The main content area features an aerial image of agricultural fields and a white box with text and four icons representing the components of the land service.

Copernicus is a European system for monitoring the Earth. Data is collected by different sources, including Earth observation satellites and in-situ sensors. The data is processed and provides reliable and up-to-date information in six thematic areas: land, marine, atmosphere, climate change, emergency management and security. The land theme is divided into four main components:

- Global**
provides a series of bio-geophysical products on the status and evolution of the land surface at global scale at mid and low spatial resolution
- Pan-European**
provides information about the land cover and land use (LC/LU), land cover and land use changes and land cover characteristics
- Local**
focuses on different hotspots, i.e. areas that are prone to specific environmental challenges and problems
- Imagery and reference data**
Satellite imagery forms the input for the creation of Copernicus land products. In order to ensure an efficient and effective use of satellite data the Copernicus land monitoring service needs access to in-situ data



Land Monitoring

Global Land Services

- Systematic production of Biophysical Variables
- Ground Based Observations for Validation
- Sentinel-2 Global Mosaics and thematic products
- Hot-Spot Monitoring (land cover change)



From medium to high resolution

Theme	Variable	Spatial Resolution
Vegetation	Land Cover	Moderate 100m
		In production

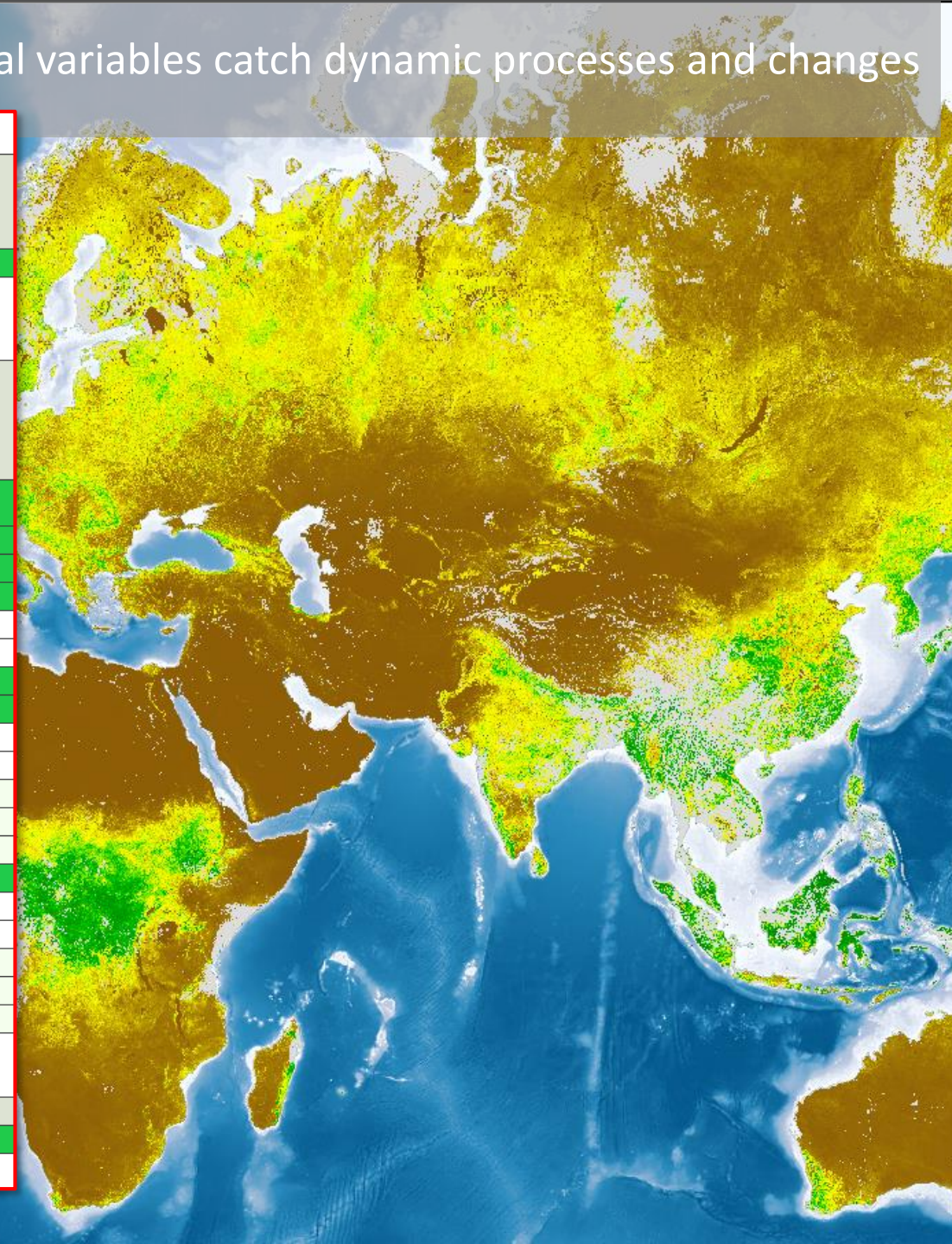
From coarse to medium resolution

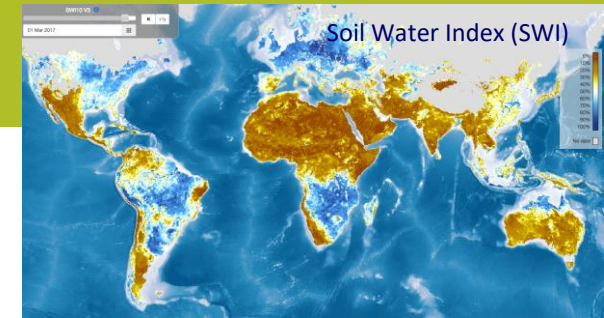
Theme	Variable	Spatial Resolution	
		Coarse >=1km	Medium 300m
Vegetation	Fraction of photosynthetically active radiation absorbed by the vegetation	In production	In production
	Fraction of green vegetation cover	In production	In production
	Leaf Area index	In production	In production
	Normalized Difference Vegetation Index	In production	In production
	Vegetation Condition Index	In production	
	Vegetation Productivity Index	In production	
	Dry Matter Productivity	In production	In production
	Burnt Area	In production	In production
	Soil Water Index	In production	
Energy	Land Surface Temperature	In production	
	Top Of Canopy Reflectance	In production	
	Surface Albedo	In production	
Water	Water Bodies	In production	In production
	Lake Surface Water Temperature	In production	
	Lake Water Quality	In production	
Cryosphere	Lake Ice Extent	In production	
	Snow Cover Extent	In production	
	Snow Water Equivalent	In production	

21 type products
3 resolutions
80+ data collections

Non-gridded products

Theme	Variable	Rivers and Lakes
Water	Water Level	In production

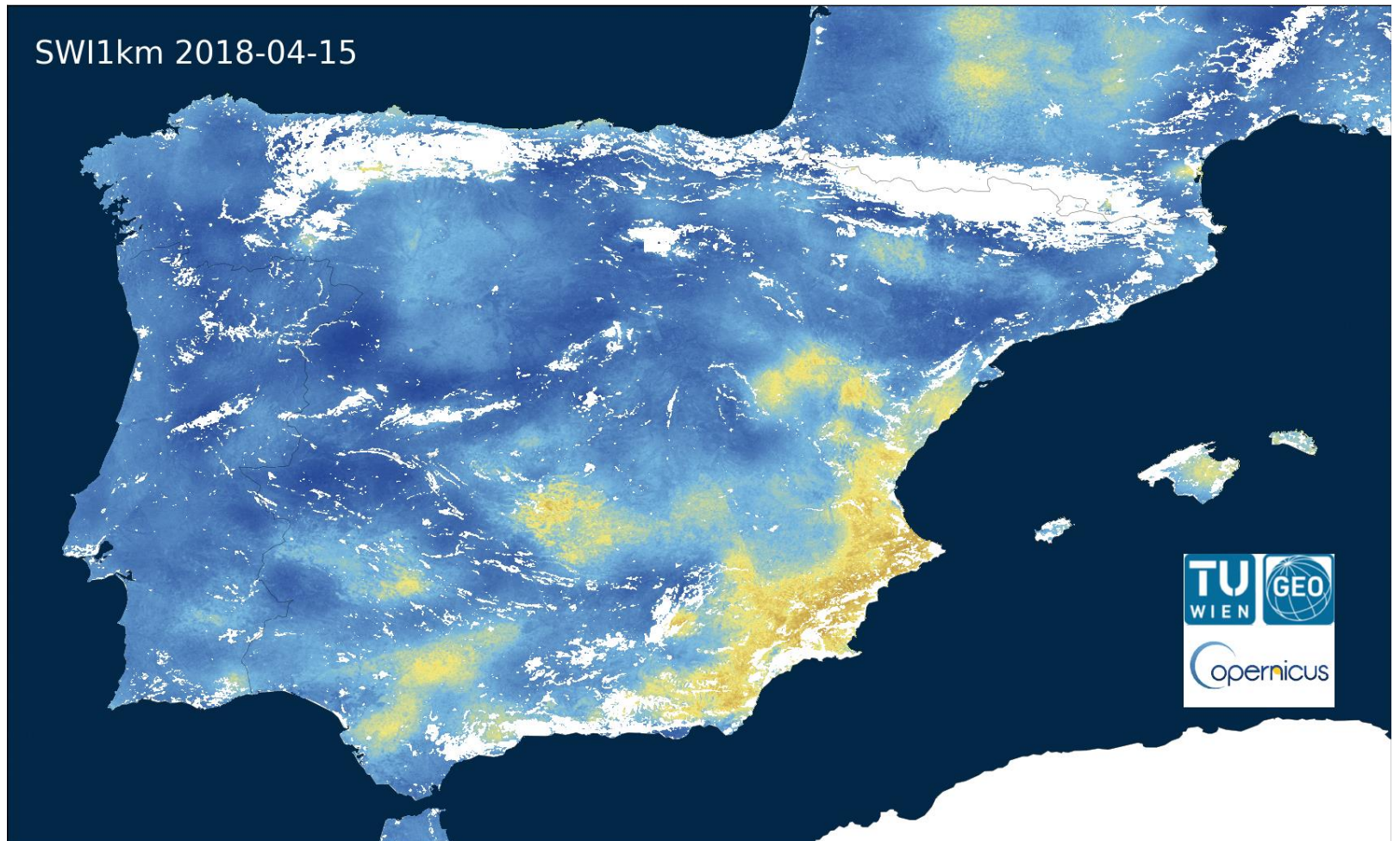




Soil Water Index

The SWI quantifies the amount of water (m^3/m^3) in soil layers at various depths and is derived from the SSM using a water balance model. The freeze and thaw status of soil is provided.

Global
Daily
1km



portfolio

Copernicus Global Land Service

Providing bio-geophysical products of global land surface



Home Products Use cases Product Access Viewing Library Get Support



Vegetation

Energy

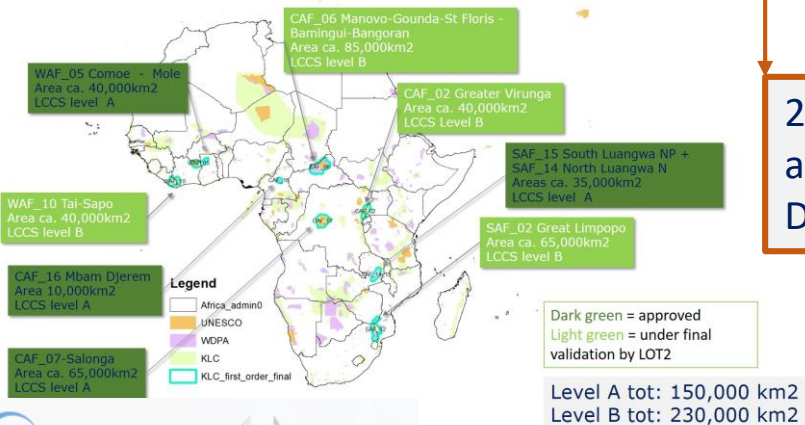
Water

Cryosphere

Hot Spots

Groundbased

20 Key Landscape zones
area: 1.273.350 km²
Detailed land cover



From medium to high resolution		
Theme	Variable	Spatial Resolution
Vegetation	Land Cover	Moderate 100m
		In production
From coarse to medium resolution		
Theme	Variable	Spatial Resolution
		Coarse >=1km Medium 300m
Vegetation	Fraction of photosynthetically active radiation absorbed by the vegetation	In production In production
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	Vegetation Productivity Index	In production In production
	Dry Matter Productivity	In production In production
	Burnt Area	In production In production
	Soil Water Index	In production In production
	Surface Soil Moisture	In production In production
Energy	Land Surface Temperature	In production In production
	Top Of Canopy Reflectance	In production In production
	Surface Albedo	In production In production

Contribute to GBOV Contact Us

Copernicus Land Monitoring

Home News Overview Sites Products Data Access Data Policy User Support Statistics

Photo: PAR sensors in Valencia Anchor Station

Ground-Based Observations for Validation (GBOV) of Copernicus Global Land Products

The GBOV service provides multiple years of high quality in-situ measurements to validate 7 core land products (Top-of-canopy reflectances, Surface albedo, fAPAR, LAI, fCover, Land Surface Temperature and Soil Moisture)

[Go to Data Access](#)

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



The Sentinel-2 Global Mosaic service

Analysis-ready data for direct and convenient usage!!

S2 L2A spectral surface reflectance temporal composites

(daily, 10day, month, quarter, yearly

AOI, resolution, coordinate system, file format, bands, ancillary)

Sentinel-2 data volumes and permutations of options make **traditional approach** of full-archive processing, storage, and distribution **prohibitive**. Instead: on-the-fly processing upon user request!

Land cover/use monitoring, deforestation, REDD+, etc.



60m, Annual mosaic 2017

15

LIFE ON LAND

Land Monitoring Service

GLOBAL LAND COVER

Country or address ...

Get startedDownloadAbout the mapContact

Classification

Open / closed forest

All forest types

Fractional Covers

False Colour Composites

Set layer opacity

st

100%

Sweden

Finland

Russia

Latvia

Belarus

Ukraine

Kazakhstan

Mongolia

China

India

Malaysia

South Africa

Madagascar

Zimbabwe

Malawi

Angola

Democratic Republic of the Congo

Cameroon

Nigeria

Ivory Coast

Senegal

Chad

Sudan

Yemen

Saudi Arabia

Egypt

Libya

Algeria

Mali

Niger

Tunisia

Morocco

Spain

Italy

Bulgaria

Greece

Turkey

Azerbaijan

Uzbekistan

Iran

Afghanistan

Pakistan

Nepal

Bangladesh

Laos

Vietnam

Sri Lanka

Maldives

Forests

Shrubland

Herbaceous vegetation

Herbaceous wetland

Moss & lichen

Bare / sparse vegetation

Cropland

Built-up

View the land cover statistics for ...

All Countries

India

Year: 2015

Total Area:147,138,497 km²

Year: 2015

Total Area:2,968,533 km²

< switch >

Forests

34.31%

24.3%

Shrubland

7.98%

4.41%

Herbaceous vegetation

17.89%

3.43%

Herbaceous wetland

0.91%

0.22%

Moss & Lichen

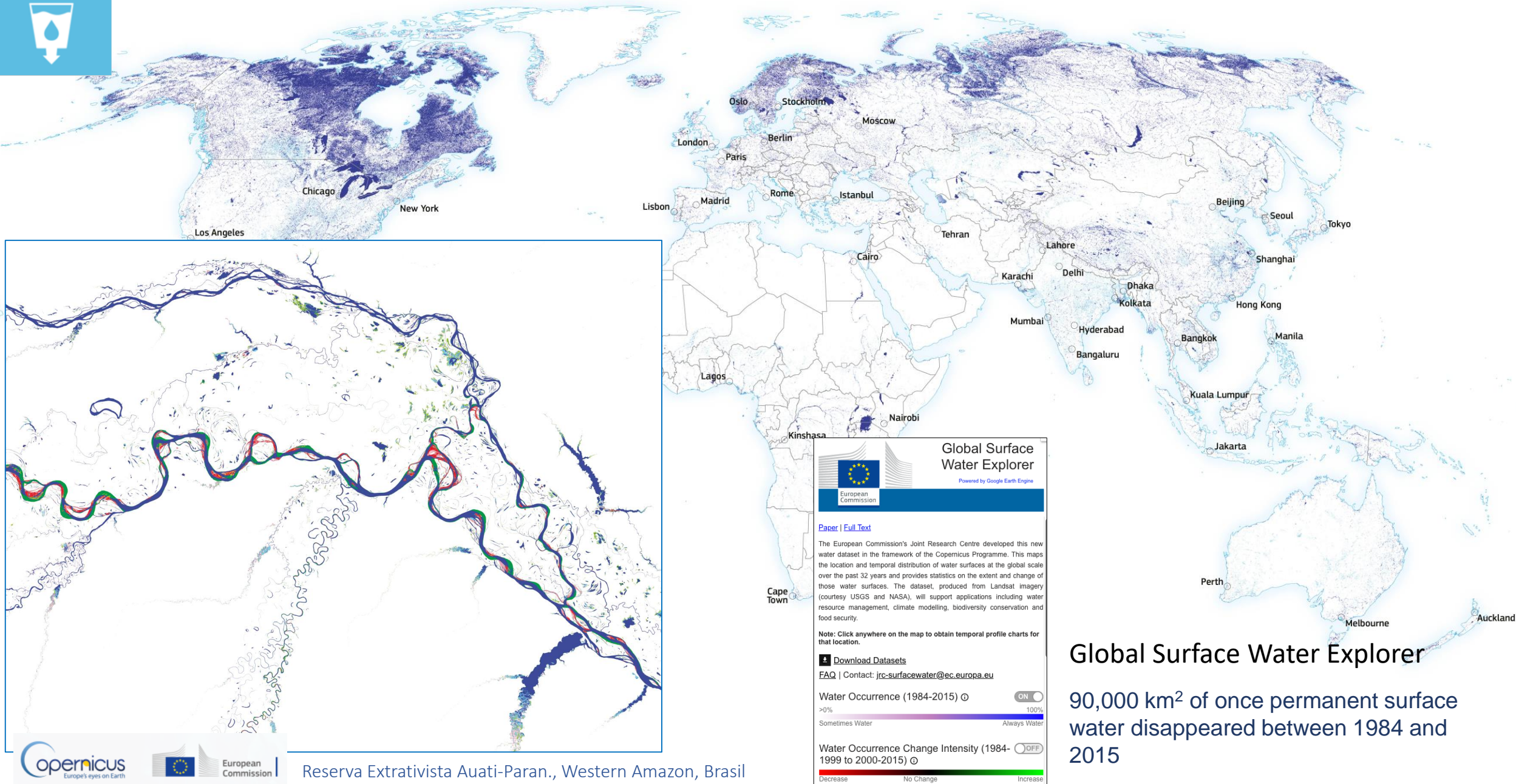
1.01%

Extraction of 270 metrics: base reflectances, time series harmonics, vegetation indicators, descriptive and data density statistics

Generation of training data for 120 000 training points from GeoWIKI's crowd-sourcing

OpenMatics

European Commission



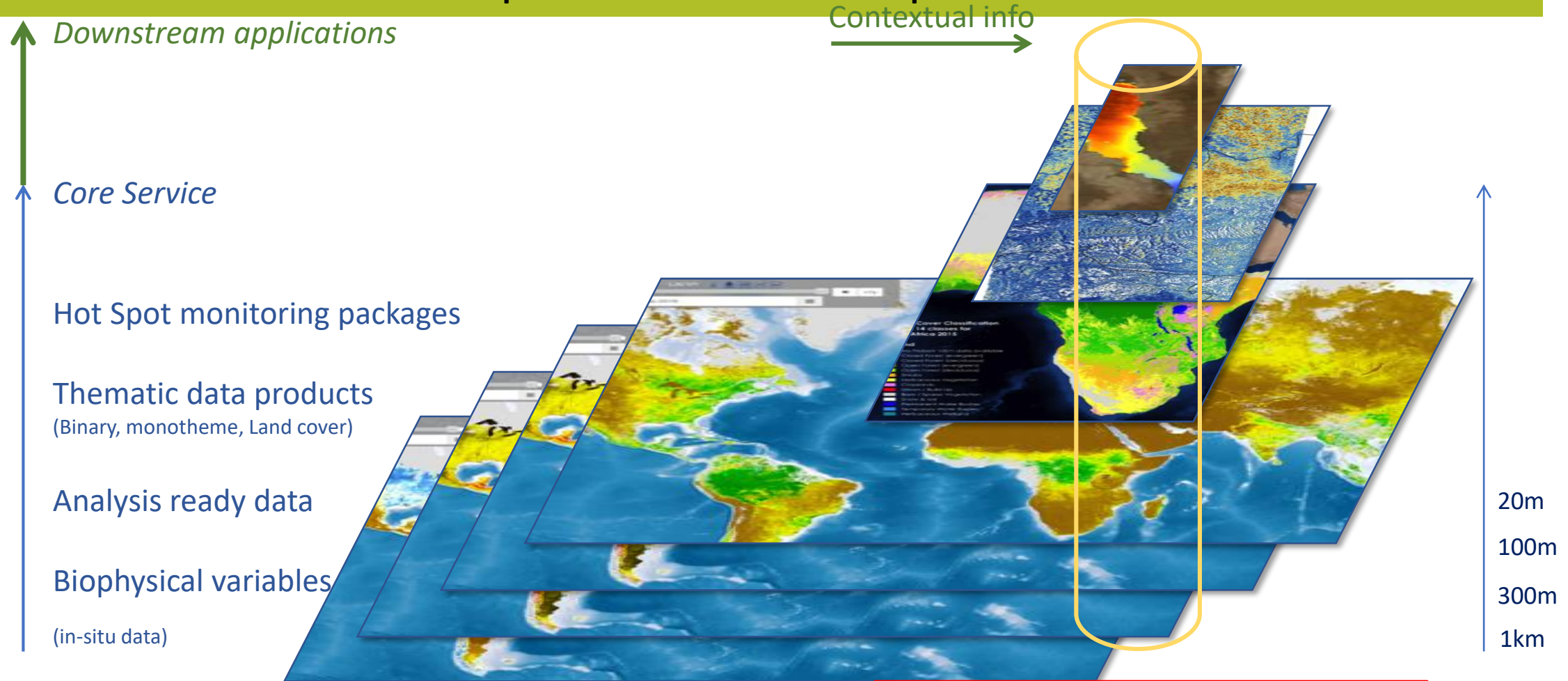
Global Surface Water Explorer

90,000 km² of once permanent surface water disappeared between 1984 and 2015

GHSL - Global Human Settlement Layer



Global Land Component concept



Moving to:

- **Higher resolution global land products**
- **Application oriented products**
- On-the-fly processed products
- Transparent access and use of products

For all Global land products

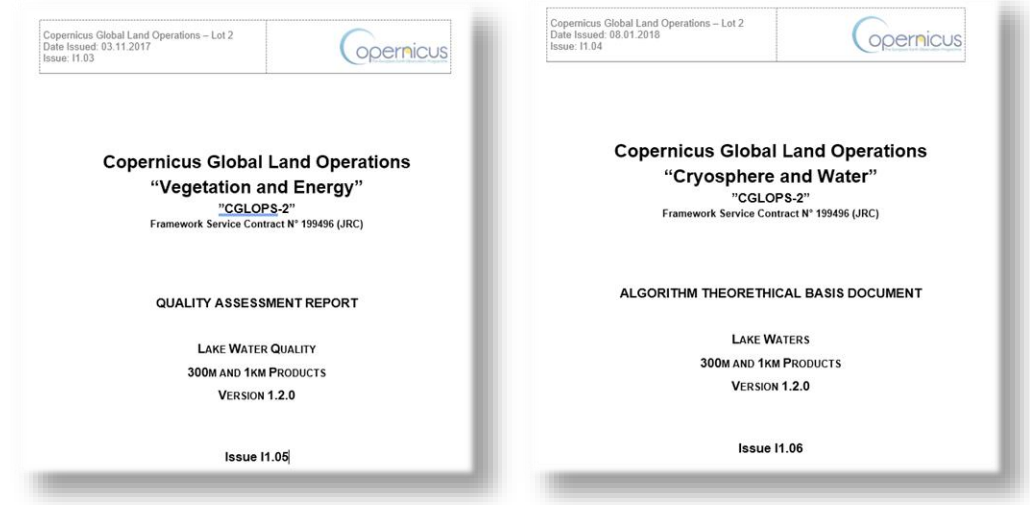
Documentation

Each product comes with a set of documents:

- ATBD (Algorithm Baseline Document)
- PUM (Produce User Manual)
- QAR (Quality Assessment Report)

➤ **Review:** Products and Documents undergo a review cycle by external reviewers

➤ **Technical User Group:**
review and update of user requirements



Lake Water Quality characteristics

LWQ 300m LWQ 1km

Access Algorithm Quality Application Technical Documents Gallery

Product Version	File(s)	Size	Available since
1	Algorithm Theoretical Basis Document	2.55 MB	2018-11-19
1	List of processed lakes	114.74 KB	2019-02-26
1	Product User Manual	1.06 MB	2018-11-16
1	Validation Report	4.87 MB	2018-11-16

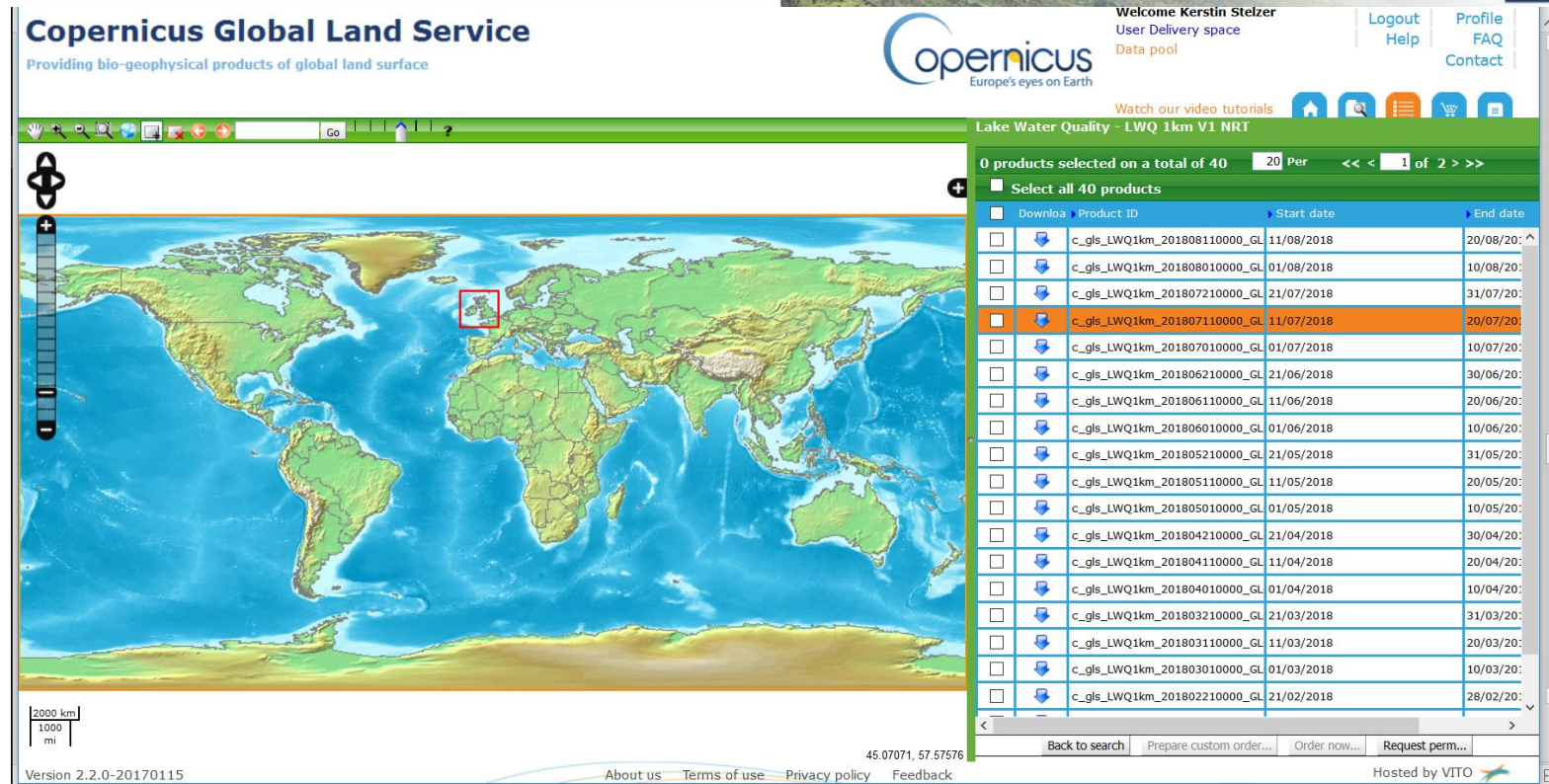
Copernicus Global Land service web site is hosted by VITO NV on behalf of the European Commission Joint Research Centre (JRC). All rights reserved. [Privacy policy](#)

Screenshot

Access

Free and open product access

- Anonymous query;
- data access after light registration
Catalogue search & Subscription
- Fast HTTP Access, APIs
- #formats
- DIAS
- JEODPP



The screenshot displays the Copernicus Global Land Service website interface. At the top, the header includes the Copernicus logo and navigation links: Home, Products, Use cases, Product Access, Viewing, Library, and Get Support. A red arrow points to the 'Product Access' link. Below the header, there is a banner image of a mountain landscape. On the right side, there are vertical buttons for 'Vegetation', 'Energy', 'Water', 'Cryosphere', 'Hot Spots', and 'Groundbased'. The main content area features a world map on the left and a table of products on the right. The table lists various land water quality products with columns for Product ID, Start date, and End date. The bottom of the page includes a footer with version information (Version 2.2.0-20170115) and links for About us, Terms of use, Privacy policy, and Feedback.

Copernicus Global Land Service
Providing bio-geophysical products of global land surface

Welcome Kerstin Stelzer
User Delivery space
Data pool

Logout Help Profile FAQ Contact

Watch our video tutorials

Lake Water Quality - LWQ 1km V1 NRT

0 products selected on a total of 40 20 Per << < 1 of 2 >>

Select all 40 products

Download	Product ID	Start date	End date
<input type="checkbox"/>	c_gls_LWQ1km_201808110000_GL	11/08/2018	20/08/2018
<input type="checkbox"/>	c_gls_LWQ1km_201808010000_GL	01/08/2018	10/08/2018
<input type="checkbox"/>	c_gls_LWQ1km_201807210000_GL	21/07/2018	31/07/2018
<input checked="" type="checkbox"/>	c_gls_LWQ1km_201807110000_GL	11/07/2018	20/07/2018
<input type="checkbox"/>	c_gls_LWQ1km_201807010000_GL	01/07/2018	10/07/2018
<input type="checkbox"/>	c_gls_LWQ1km_201806210000_GL	21/06/2018	30/06/2018
<input type="checkbox"/>	c_gls_LWQ1km_201806110000_GL	11/06/2018	20/06/2018
<input type="checkbox"/>	c_gls_LWQ1km_201806010000_GL	01/06/2018	10/06/2018
<input type="checkbox"/>	c_gls_LWQ1km_201805210000_GL	21/05/2018	31/05/2018
<input type="checkbox"/>	c_gls_LWQ1km_201805110000_GL	11/05/2018	20/05/2018
<input type="checkbox"/>	c_gls_LWQ1km_201805010000_GL	01/05/2018	10/05/2018
<input type="checkbox"/>	c_gls_LWQ1km_201804210000_GL	21/04/2018	30/04/2018
<input type="checkbox"/>	c_gls_LWQ1km_201804110000_GL	11/04/2018	20/04/2018
<input type="checkbox"/>	c_gls_LWQ1km_201804010000_GL	01/04/2018	10/04/2018
<input type="checkbox"/>	c_gls_LWQ1km_201803210000_GL	21/03/2018	31/03/2018
<input type="checkbox"/>	c_gls_LWQ1km_201803110000_GL	11/03/2018	20/03/2018
<input type="checkbox"/>	c_gls_LWQ1km_201803010000_GL	01/03/2018	10/03/2018
<input type="checkbox"/>	c_gls_LWQ1km_201802210000_GL	21/02/2018	28/02/2018

Back to search Prepare custom order... Order now... Request perm...

Hosted by VITO



DIAS

Conventional Data Access Hubs

DIAS

To facilitate and standardise access to data, the European Commission has funded the deployment of five cloud-based platforms providing centralised access to Copernicus data and information, as well as to processing tools. These platforms are known as the DIAS, or Data and Information Access Services.

Screenshot

Home > Access to Data

DIAS

Conventional Data Access Hubs

Access to Data

Copernicus builds on a constellations of satellites making millions an impressive number of of daily observations, as well as on a global network of thousands of land-, air- and marine-based sensors to create the most detailed pictures of Earth. The technological evolution, especially in terms of availability and accessibility, has made Copernicus the largest space data provider in the world, currently producing 12 terabytes per day.

The vast majority of data and information delivered by the Copernicus Space infrastructure and the Copernicus services are made available and accessible to any citizen and any organisation around the world on a **free, full and open access basis**. You can access Copernicus Data and Information Services through the DIAS or the Conventional Data Hubs.

[Go to DIAS](#)

[Go to Access Hubs](#)

Services Portfolio Search Tool

Faithful to its mission to provide strategic, social, economic and environmental benefits to European public authorities and to the civil society, the European Commission has designed a downstream service tailored to the specific needs of Copernicus users, making easier the access to data and information.

The interface displays a comprehensive list of information products and other functionalities such as data extraction, data manipulation and queries in a secure and user-friendly approach, no matter the user profile.

Services Portfolio Search Tool

Enter a name or keyword

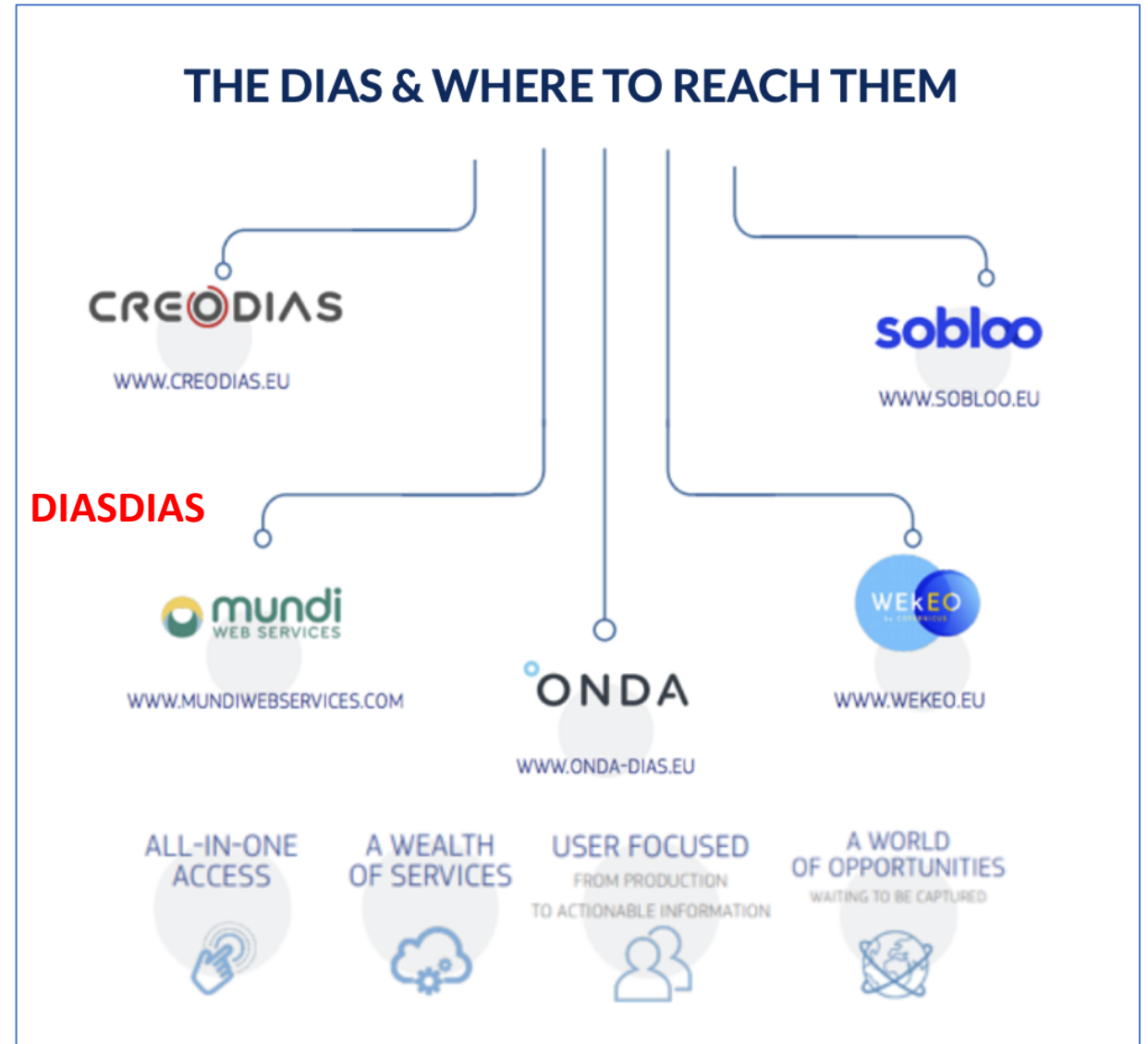
Search

Copernicus **DIAS**

Data and Information Access Services

Cloud computing platforms

- Sentinel data, service products
- Interactive interface for setting up data processing
- GL Scripts and notebooks planned



<https://www.copernicus.eu/en/access-data/dias>

Home > Access to Data

DIAS

Conventional Data Access Hubs

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Enter a name or keyword

Search

Conventional Data Access Hubs

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Copernicus provides knowledge, but it all starts with data.



Two access points to Copernicus satellite data are managed by ESA:

Copernicus Open Access Hub

Previously known as Sentinels Scientific Data Hub, the portal provides access to Sentinel data through an interactive graphical user interface. The portal will also provide access to data produced by future Sentinel missions when available.

Copernicus Space Component Data Access (CSCDA)

The portal provides access to the Copernicus collaborative ground segment. Anyone can view and discover data, but downloading images is restricted to public authorities, European projects and Copernicus services.

Two access points to Copernicus satellite data are managed by EUMETSAT:

EUMETCast

Any environmental data, of any format, can be distributed through EUMETCast. The platform delivers more than 380 different product collections, including EUMETSAT's own satellite data, Copernicus marine and atmosphere data, and a wide range of third-party products.

Copernicus Online Data Access (CODA)

The Sentinel-3 CODA (Copernicus Online Data Access) Web Service provides free and open access to Sentinel-3 products through a 12 months rolling archive with access to Level 1 and Level 2 Marine data in different latency modes (Near Real-Time, Short Time Critical, Non Time Critical). Access is provided either through CODA user interface or through CODA APIs. Both user interface and APIs allow users to set different parameters (geographic area, time, type of product etc) to refine their search in the archive of products. In case users need data older than one year, it is possible to use the EUMETSAT Data Centre.



Welcome to the Copernicus Open Access Hub

The Copernicus Open Access Hub (previously known as Sentinels Scientific Data Hub) provides complete, free and open access to [Sentinel-1](#), [Sentinel-2](#), [Sentinel-3](#) and [Sentinel-5P](#) user products, starting from the In-Orbit Commissioning Review (IOCR).

Sentinel Data are also available via the Copernicus Data and Information Access Services (DIAS) through several [platforms](#).



Please visit our [User Guide](#) for getting started with the Data Hub Interface. Discover how to use the APIs and create scripts for automatic search and download of Sentinels' data.

Latest update: see the section on [Long Term Archive](#) for the upgrade of the interfaces for access to offline data.

For further details or requests of support please send an e-mail to eosupport@copernicus.esa.int



Open Hub



API Hub



S-5P Pre-Ops



GNSS Hub

Latest News



[all the news](#)



Copernicus Sentinel-1A unavailability on 14 September 2019

16 Sep 2019

Copernicus Sentinel-1A was unavailable on 14 September between 00:43 and 10:17 UTC, due to a SAR anomaly. No data were generated during this period.



Copernicus Sentinel-2A MSI decontamination on 23 and 24 September 2019

14 Sep 2019

A routine decontamination activity of the Copernicus Sentinel-2A MSI is planned to take place between 09:00 UTC on 23 September and 09:00 UTC on 24 September (corresponding approximately to the period between absolute orbits 22212 to 22226).

Reports & Stats

Data updated hourly



33,772

prod. published in the last 24h

(S1 + S2 + S3 + S5P)



241,323

downloads in the last 24h

(SciHub + API Hub +
S-3 PreOps + S-5P PreOps)



Reports

Resources



DHUS Open Source Portal



Copernicus Portal



Sentinel Online



S-1 Quality Control



S-2 Quality Reports

AI4Copernicus

Copernicus data archives are untapped data assets, especially in their entirety!

Adoption of new processing paradigms to mine and integrate the vast data archives is required.

Linkages with A.I. initiatives and programmes in highly required – DIAS can facilitate

Research and Development

Copernicus is an operational service programme

Research and Development is needed and implemented through 'Horizon Europe'

to guarantee the continuation of the correct transition from research activities to operational services

More and better products

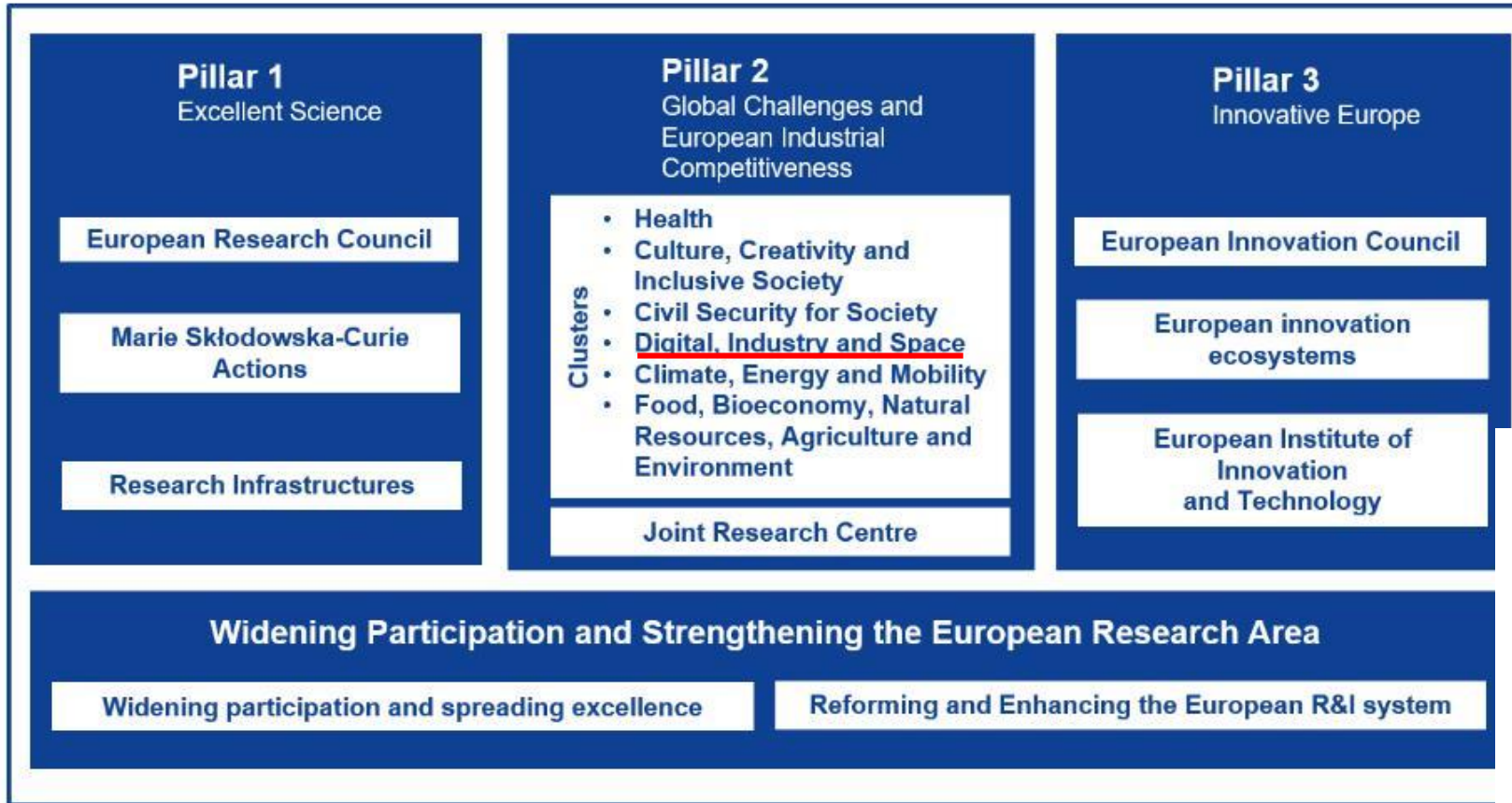
At the cutting-edge of competition and spin-in of technology

Seize the big data opportunity to fully exploit data and information

Horizon 2020: 18000+ projects for €31+Bill

Research and Development

‘Horizon Europe’



Adoption timeline

- **2 May 2018**
The Commission adopts its proposal for the next EU long-term budget (MFF)
- **7 June 2018**
The Commission adopts its proposal for Horizon Europe
- **2019-2020**
The Council and European Parliament negotiate and subsequently adopt the programme
- **1 January 2021**
Horizon Europe is launched

A satellite image showing a mountainous landscape. A large, elongated lake is visible in the center, surrounded by steep, forested slopes. In the upper right, there is a smaller, circular lake. The terrain is rugged with various shades of green and brown, indicating different vegetation and geological features.

Thank You!

Michael.cherlet@eu.europa.ec