

# Access to Copernicus Data

**Overview and Introduction** 





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#### COPERNICUS IN BRIEF

Copernicus

- **Copernicus, a flagship programme** of the European Union:
  - Monitors **the Earth**, its environment and ecosystems
  - Prepares for crises, security risks and natural or man-made disasters
  - Contributes to the EU's role as a global soft power
- Adopts a full, free and open data policy
- Is a tool for economic development and a driver for the digital economy





#### COPERNICUS GOVERNANCE







#### COPERNICUS IS DRIVEN BY THE USERS





# Copernicus Data Access

User Uptake

- 10 European Access points
- Several national and private initiatives





Data

Access

#### Copernicus Data Access Overview

• 10 European Data Access points:

- 4 for Satellite Datas
- 6 for Services Data and Information
- Satellite data =
  - Access to images in NRT
  - Access to archives
- Services Data and Information=
  - Added value products, indicators
  - Models
  - Archives, Near Real Time and Forecasts products





#### Access to Satellite Data

• 4 data access points:

Space

Component

- 2 managed by ESA:
  - Scientific Data Hub (SCI Hub)
  - Copernicus Space Component Data Access (CSCDA)
- 2 managed by EUMETSAT
  - EUMETCast
  - Copernicus Online Data Access (CODA)









#### SCI-HUB IN PRACTICE (EXAMPLE)

Component

#### On <a href="https://scihub.copernicus.eu/dhus/#/home">https://scihub.copernicus.eu/dhus/#/home</a>:

- Draw region of interest
- Click on the Menu button to the left. A popup opens where you can fill out your search parameters, and select the mission you need.
- Click the Search icon.





9







#### Copernicus Online Data Access

- Brand new Copernicus Access Point
- No need for satellite dishes
- All Sentinel-3 marine and atmosphere products through a rolling buffer which at is maximum will span up to 12 months worth of data.
- 2 access modes:

Space

Component

FULL, FREE AND

- The ftp provides access to a fixed set of global and regional marine and atmosphere data.
- The user interface allows users to select their own area of interest from the global products.
- Work in Progress (URL to come next month)



**EUMETSAT** 



Access

#### Access to Services Data and Information

• 6 Thematic Copernicus Services:

- 5 are under Full, free and open access:
  - Land (CLMS)
  - Marine (CMEMS)
  - Atmosphere (CAMS) 🥟
  - Climate (C3S)
  - Emergency (EMS)
- 1 has restricted access
  - Security







## COPERNICUS SERVICES

Data Access





Land

Monitoring

FULL, FREE AND OPEN

What type of product is available ?

- Land Use / Land Cover (CORINE)
- Hydrology
- Digital Elevation Model (DEM) —
- Urban Atlas —
- Natura 2000, \_
- etc...





Global <u>http://land.c</u> •	opernicus.vgt.vito.be/PDF/portal/Application.html#Home	Copernicus Global Land Service
	Register or log in Select portal with desired parameters Indicate time frame and area of interest Download the selected result	
Pan-European • • •	http://land.copernicus.eu/pan-european Select the desired portal Switch to Download tab Select the desired dataset Agree and download the selected result	Autor St. Band Autor     Band St. Band Autor     Band St. Band Autor
Local • • •	http://land.copernicus.eu/local Select the desired portal Switch to Download tab Select the desired dataset Agree and download the selected result	Security     Security       Advance     Country
	• Pan-European • • • • • • • • • • • • • • • • • • •	<ul> <li>Indicate time frame and area of interest</li> <li>Download the selected result</li> <li>Pan-European <a href="http://land.copernicus.eu/pan-european">http://land.copernicus.eu/pan-european</a></li> <li>Select the desired portal</li> <li>Switch to Download tab</li> <li>Select the desired dataset</li> <li>Agree and download the selected result</li> <li>Agree the desired portal</li> <li>Select the desired dataset</li> <li>Agree and download tab</li> <li>Select the desired dataset</li> <li>Agree and download the selected result</li> </ul>



## ACCESS TO CMEMS

#### What type of product is available ?

- 140 products
- Key physical and biogeochemical ocean parameters (currents, temperature, chlorophyll ...)
- Global ocean and 6 European regional seas
- Analysis, forecast and long time series
- Models and observations (Satellite or in situ)
- In 2017 waves will be added





## ACCESS TO CAMS

Atmosphere Monitoring FULL, FREE AND FULL, OPEN

- CAMS provide information on air quality and on the atmosphere composition.
- CAMS answers the following questions:
  - What will the air we breathe be like tomorrow?
  - Where are the best places for my solar farm? What is the yield I can expect?





### ACCESS TO CAMS

Atmosphere Monitoring



http://atmosphere.copernicus.eu/ Catalogue → Enter

Select parameters. Click Data Download.

Log in to ECMWF server. Select parameters and time frame. Download result.



Global concert

S.S.C.

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Catalogue

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20

Read



### ACCESS TO C3S

Climate

Change

FULL, FREE AND

- C3S= Copernicus Climate Change Service
- Under construction with Sectoral Information System (Insurance, Water, Energy, etc.) and specific portals and indicators
- Some datasets already available.







#### ACCESS TO EMS



- EMS answers to :
  - floods,
  - tsunami,
  - earthquake,
  - landslides,
  - fires,
  - severe storms,
  - humanitarian crisis,
  - volcanic eruptions,
  - technological disaster
- Only authorized users can trigger the service
- But everybody can assess maps!





#### ACCESS TO EMS

Emergency Management

#### http://emergency.copernicus.eu/

- Under Rapid Mapping, click on List of Activations
- Search by Activation Status, Event Type, Date or Country
- Click on the event of interest.
- Download the available maps.
- Under Risk and Recovery, click on List of Activations
- Search by Activation Status, Event Type, Date or Country
- Click on the event of interest
- Download the available maps

	COPERN	ICUS						
Commission						٩		
Home								
Home   What is Coperni	icus   EMS -	Mapping	EMS - Early	Warning System			Vews	
LATEST NEWS · 2016-09-12	[EMSR180] Fire	s on Thas	sos Island					
	List of	EMS	Rapid Ma	pping Acti	vations			
- Camira Grandani								
Service Overview	Title	Title Event Type Event Date (UTC)		Affected Countries				
<ul> <li>Who can use the service</li> </ul>	Contains		Forest fire, wild fire	Start date	Afghanistan	Afghanistan		
<ul> <li>How to use the service</li> </ul>			Bapaladesh					
Products: Rapid Mapping	Activation Stat	Activation Status Earthquale Industrial accident . Any . • • Other • • Eq. 2016-09-14 End date Eq. 2016-09-14		Belgium				
Droducte: Rick and Recounty	- Any -			Bermuda				
- Produces, has and necovery				Bosnia and Herzegovina *		-		
	Apply Reset					Select multiple countries with Ctrl/Cmd		
Quality control / Feedback     Alexa phase in baief	Appy Re							
Quality control / Feedback     New phase in brief     User Guide	Act. Code	Title		Event Date	Туре	Country	Fee	
Quality control / Feedback     New phase in brief     User Guide	Act. Code T EMSR 180	Title Fires on 7	hassos Island	Event Date 2016-09-10	Type Forest fire, w	Country Greece	Fee	
Quality control / Feedback     New phase in brief     User Guide     RAPID MAPPING	Act. Code == EMSR180 EMSR177	Title Fires on 1 Earthqua	hassos Island ke in Central Italy	Event Date 2016-09-10 2016-08-24	Type Forest fire, w Earthquake	Country Greece Italy	Fee O O	
Quality control / Feedback     New phase in brief     User Guide     RAPID MAPPING	Act. Code = EMSR180 EMSR177 EMSR176	Title Fires on 1 Earthqua Flood in 1	hassos Island ke in Central Italy ouisiana	Event Date 2016-09-10 2016-08-24 2016-08-12	Type Forest fire, w Earthquake Flood	Country Greece Italy United States	Fee O O O	
Quality control / Feedback     New phase in brief     User Guide     RAPID MAPPING     List of Activations	Act. Code ** EMSR180 EMSR177 EMSR176 EMSR175	Title Fires on 1 Earthqua Flood in 1 Forest Fir	hassos Island ke in Central Italy ouisiana e in Madeira Island	Event Date 2016-09-10 2016-08-24 2016-08-12 2016-08-08	Type Forest fire, w Earthquake Flood Forest fire, w	Country Greece Italy United States Portugal	Fee G G G G	
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Quality control / Feedback New phase in brief User Guide RAPID MAPPING List of Activations Map of Activations GeoRSS Feed List yeader.	Act. Code ** EMSR180 EMSR177 EMSR176 EMSR175 EMSR174 EMSR173	Title Fires on 1 Earthqua Flood in 1 Forest Fir Flood in 1 Forest Fir	Thassos Island ke in Central Italy cuisiana e in Madeira Island škopje e in La Palma Island	Event Date 2016-09-10 2018-08-24 2016-08-12 2016-08-08 2016-08-07 2016-08-03	Type Forest fire, w Earthquake Flood Forest fire, w Flood Forest fire, w	Country Greece Italy United States Portugal Hacedonia Spain	Fee	
Quality control / Feedback New phase in brief User Guide RAPID MAPPING List of Activations Map of Activations GeoRSS Feed 114 Presser VISEA AND RECOVERY	Act. Code ** EMSR180 EMSR177 EMSR176 EMSR177 EMSR174 EMSR173 EMSR172	Title Fires on 1 Earthque Flood in 1 Flood in 1 Forest Fin Seismic a	Thassos Island ke in Central Italy ouisiana e in Madeira Island Skopje e in La Palma Island ctivity in Brava Islan	Event Date 2016-09-10 2016-08-24 2016-08-08 2016-08-08 2016-08-07 2016-08-03 4 2016-08-03	Type Forest fire, w Earthquake Flood Forest fire, w Flood Forest fire, w Earthquake	Country Greece Italy United States Portugal Macedonis Spain Cape Verde	Fee G G G G G G G G G G G G G	
Quality control / Feedback New phase in brief User Suide KAPID MAPPING List of Activations Map of Activations GeoRSS Feed II4 Instein RISK AND RECOVERY	Act. Code ** EMSR180 EMSR177 EMSR176 EMSR175 EMSR174 EMSR173 EMSR172 EMSR171	Title Fires on T Earthqua Flood in 1 Forest Fir Flood in 2 Forest Fir Seismic a Forest Fir	hiassos Island ke in Central Italy .ouisiana e in Mađeira Island ikopje e in La Palma Island ctivity in Brava Islan e in Sardinia	Event Date 2016-09-10 2016-08-24 2016-08-12 2016-08-08 2016-08-07 2016-08-03 2016-08-07	Type Forest fire, w Earthquake Flood Forest fire, w Flood Forest fire, w Earthquake Forest fire, w	Country Greece Italy United States Portugal Macedonis Spain Cape Verde Italy	Fee 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6	

#### EMSR180: Fires on Thassos Island





#### Access to Security Service

The Copernicus service for Security applications aims to support European Union policies by providing information in response to Europe's security challenges. It improves crisis prevention, preparedness and response in three key areas:

- Border surveillance;
- Maritime surveillance;
- Support to EU External Action.

Its access is strictly restricted to authorised users





# Copernicus Access to Data

User Uptake

National and private Initiatives





Data Access

### OTHER DATA ACCESS PUBLIC INITIATIVES

#### National Initiatives- Collaborative Ground Segment

Initiative Name	Initiative Leader	Website and Target User Group
THEIA Land Data Centre	CEA, Cerema, IRSTEA, IRD, CNRS, INRA, IGN, Meteo France, CIRAD, ONERA	<ul><li>URL: theia-land.fr</li><li>Scientific communities and public authorities</li></ul>
NOA Hellenic National Sentinel Data Mirror Site	NOA, IAASARS	<ul> <li>URL: sentinels.space.noa.fr</li> <li>Scientific communities, public authorities, private industry players</li> </ul>
CATAPULT Satellite Applications and CEDA	UK Space Agency	<ul> <li>URL: sa.catapult.org.uk</li> <li>Scientific communities, public authorities, private industry players</li> </ul>
ESA Thematic Exploitation Platforms	ESA	<ul><li>URL: tep.eo.esa.int</li><li>All user types</li></ul>
Platform for Exploiting Products from Sentinels (PEPS1)	CNES	<ul><li>URL: peps.cnes.fr</li><li>Scientific communities and public authorities</li></ul>
		27 Copernicus European Commiss



### OTHER DATA ACCESS PRIVATE INITIATIVES

Data Access

Private	Initiatives

Initiative Name	Initiative Leader	Website and Target User Group
CLOUDEO	CloudEO	<ul> <li>URL: cloudeo-ag.com</li> <li>Users and developers of geo services, providers of geo data, services, applications and tools</li> </ul>
Earth Observation Data Centre (EODC) for water resources monitoring	Vienna University of Technology Department of Geodesy and Geo-info	<ul><li>URL: eodc.eu</li><li>Regional public authorities and private users</li></ul>
GEOPEDIA platform	Sinergise	<ul> <li>URL: geopedia.world</li> <li>National, regional public authorities and private users</li> </ul>
GEOSTORM platform	CS-SI	<ul><li>URL: geostorm.eu</li><li>Regional authorities and private users</li></ul>
Sentinel-2 on AWS	Amazon	<ul> <li>URL: sentinel-pds.s3-website.eu-central- 1.amazonaws.com</li> <li>Developers, private/public downstream players</li> </ul>
Google Earth Engine	Google	<ul><li>URL: earthengine.google.com</li><li>Regional authorities and private users</li></ul>

\* The European Commission does not endorse any particular commercial solution

28



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# Using the ESA/EUMETCAST Navigators

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Space

Copernicus User Uptake Information Sessions Data Access

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Data

Access

#### INTRODUCTION OF USE CASE

- Overview of access to the satellite data available under Copernicus
- 2 official distributors of Copernicus satellite data:
  - ESA : <u>https://sentinel.esa.int/web/sentinel/sentinel-data-access</u>
  - EUMETSAT : <u>http://www.eumetsat.int/website/home/Copernicus/AccessData/index.html</u>
- Presentation of the registration process
- How to download Copernicus satellite data (Sentinel-2 and Sentinel-3)?
  - On 20 October 2016, the first operational products from Sentinel-3 were made available.











Data

#### ESA Data access navigator

Five mechanisms are Access available to access Sentinel data depending on the

status of the user






### ESA Sentinel data hub

Data Access

# opernicus Sentinels Scientific Data Hub

#### Welcome to the Sentinels Scientific/Other use Data Hub

The Sentinels Scientific Data Hub provides complete, free and open access to Sentinel-1 and Sentinel-2 user products, starting from the In-Orbit Commissioning Review (IOCR).



**Scientific Hub**: access point for all sentinel mission with access to the interactive graphical user interface. **API Hub**: access point for API users with no graphical interface. All API users regularly downloading the latest data are encouraged to use this access point for a better performance. **Sentinel-3 Pre-operational Hub**: pre-operational access point for all users to Sentinel-3 data.<sub>37</sub>

Login credentials are s3guest:s3guest



@esa



The self-registration procedure is explained online: <u>https://scihub.copernicus.eu/userguide/1SelfRegistration</u>





### ESA Sentinel data hub: search and download

Data Access

- The Graphical User Interface for the Search and Download is explained online https://scihub.copernicus.eu/userguide/2GraphicalUserInterface
- To search for and download, go to <u>https://scihub.copernicus.eu/dhus/#/home</u>
- Draw your region of interest





### ESA Coordinated Data Access System (CSC-DA)

Data Access

- Need to register before login as the portal is accessible to eligible users only
- Up to 72 hours to get registered
- Explore the data offer
- Keep attention to latest news



41

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### ESA CSC-DA: registration

Data Access

- Through the CSC-DA, ESA organises the procurement of EO data from Copernicus Sentinels Missions and from Copernicus Contributing Missions (e.g. Pleiades, TERRASAR-X, COSMO-SkyMed, IKONOS, QuickBird).
- Details on the datasets and the conditions (i.e. data licensing, ordering mechanisms, product types available, delivery timelines, data access mechanisms) is available here: <u>https://spacedata.copernicus.eu/documents/12833/14545/DAP\_Rel</u> ease\_Phase\_2

• The registration procedure is explained online <u>https://spacedata.copernicus.eu/documents/12833/20397/CDS+Registration+Guidelines</u>





Access

### ESA CSC-DA: two types of datasets

#### CORE Datasets

- Fixed part of the data offer, consisting in continuous data delivery from systematic missions or generation of large predefined coverages.
- Access rights are specific to each dataset, and are defined in the section of the portal.
- Access is via subscription.

#### Example:

Optical VHR multispectral and panchromatic coverage over Europe (VHR\_IMAGE\_2015) Optical MR2 Worldwide coverage (MR\_OPTICAL\_GLOBAL) VHR1-2 Urban Atlas 2012

### ADDitional Datasets

- Variable part of the data offer for which 40 data type categories are defined in terms of resolution, service type (Rush/Standard, Archive/New tasking), mission type (optical/SAR).
- Depending on their requirements, eligible users are granted a quota by the European Commission and may order data within these datasets.
- Eligibility is defined in the Access Rights section of the portal.
- Access via ordering.





### ESA CSDA: how to access data

Data Access

#### - How to Access Data



44



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## EUMETSAT Data Access Navigator

Data

Access

EUMETSAT offers a range of data delivery mechanisms to meet the needs of the user:

EUMETCast	EUMETCast is a multi-service push dissemination system based on multicast technology. The multicast stream is transported to the user via satellite.
Copernicus Online Data Access (CODA)	Download service offers all Sentinel-3 marine and atmosphere products through a rolling buffer which at is maximum will span up to 12 months of data
Data Centre Long-Term Archive	Ordering application enables users to browse and select from EUMETSAT's long-term archive of products, including the Copernicus Sentinel-3 marine and atmosphere products
EUMETView	EUMETView is a visualisation service that allows users to view EUMETSAT 's data and Copernicus Sentinel-3 marine data in an interactive way using an online map viewer







### EUMETSAT's Data Push Service

Data Access

- EUMETCast is EUMETSAT's integrated dissemination system for the delivery of near real-time environmental data including S3 and later on S4 and S5;
- EUMETCast Satellite service has coverage over Europe, the Middle-East and Africa;

### **Key Features:**

- Targets a large audience and delivers a wide range of earth observation data;
- Near real-time data stream includes Meteosat, Metop, Jason-2 / -3, Sentinel-3 satellite data and wide range of third-party satellite data services;
- Service utilises low cost, user-friendly satellite receiving equipment similar to satellite TV;
- Secure delivery of data files to targeted audiences, with guaranteed service level.







EUMETCast station set-up video



### EUMETSAT's CODA Download Service

Data Access



- CODA is an online rolling archive with http access. It provides access to Sentinel-3 Level 1 and Level 2 global data in near realtime (NRT), short time critical (STC) and none time critical (NTC) latency mode;
- Current service provides a 14-day archive of data this will increase to a one year archive in the coming months. For longer time-series data we provide an archive ordering system through the Data Centre;
- The user manual explains how to use the online tool, including how to download via an API;
- It's easy to display the downloaded images using standard GIS desktop applications.

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47



### EUMETSAT's Archive Data Ordering Service

Data Access

• The Data Centre provides access to the longterm archive of S3 and EUMETSAT mission data.

#### **Key Features:**

- Order options allow you to select your chosen format, spatial and spectral sub-setting and apply data compression;
- Orders are automatically processed and smaller orders are delivered within a few hours;
- Resulting data can be retrieved from an online server (http-download) or via offline media, depending on the volume of data requested;
- The Data Centre catalogue spans the whole satellite mission life. It guarantees the long-term preservation of these data which are critical for the generation of climate data records.



48







### EUMETView interactive view service

Data Access EUMETView is a visualisation service to view EUMETSAT (Meteosat, Metop and Jason data) and Copernicus Sentinel-3 marine imagery in an interactive way using an online map viewer.

#### **Key Features:**

- Choose a layer, select the date range and area of interest and display your chosen visualisation;
- Run an animated loop or download your selected visualisations;
- EUMETView implements the OGC Web Map Service (WMS) Interface Standard and can be used to request and overlay products in GIS clients supporting OGC WMS 1.3.0.





Access

### Discovery and Registration Service

 To discover the full list of products EUMETSAT provides use our Product Navigator;

- This central catalogue lists all EUMETSAT (Meteosat, Metop, Jason-2) and Copernicus Sentinel-3 marine and atmosphere products. It includes the third-party products disseminated via EUMETCast.
- To access our data register through our central EO portal:
  - Firstly, create your account;
  - From within the EO portal home page select your chosen delivery mechanism/s, e.g. CODA, Data Centre, EUMETCast;
  - For the CODA and the Data Centre simply follow the links to access the service directly;
  - For EUMETCast complete the detailed registration steps to subscribe to the data streams you require and to request the quantity of EUMETCast Client Software packages you need;
  - For CODA separate login credentials will be emailed to you. In future you will be able to use your EO Portal credentials to login to CODA.
- EUMETView is available without registration.

EUMETCAST SATELLITE Access to hear real-line data through DVB asallet with a guaranteed service level. Available data. Meteosat, Metop. Jason, Copernicus Sentinel-3 marine data and third any products. D View/Edit	COPERNICUS ONLINE DATA ACCESS Download service via Internet for Copernicus data. Available data Sentinel-3 marine data.	DATA CENTRE Ordering and delivery service for historical and long-term archive data. Available data: Neteroast, Metop, Jason and Copernicus Sentinel-3 marine data. O Access O Access via Old Client
EUMETCAST TERRESTRIAL DEMORSTRATION Recess to near end after data through terrestrial networks. Restricted to agencies only Copernicus Semental Small and the party products.	EIMETSAT FITP DATA ACCESS Doomlaad source via Internet for EUMETSAT da	Construction Construction Construction Construction Construction Subscribe
subscriptions to operational service news		
USER NOTIFICATION SERVICE E-mail announcement service providing updates on operational services.		



50

	eoportal.eumetsat.ir	nt create and manage your user account, subscribe to our services	
	navigator.eumetsat.i	int explore our catalogue, what and where, supporting documentation	For everything els www.eumetsat.ir
	eumetcast.com	learn more about our push delivery service	Any questions
	<u>coda.eumetsat.int</u>	download Sentinel-3 marine and atmosphere data	Helpdesk at ops@eumetsat.ir
	archive.eumetsat.int	order past data	
C	eumetview.eumetsa	t.int visualise and explore, create layers in GIS applications	



# Using a catalogue browser for data

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Access

### INTRODUCTION OF USE CASE

- 2 objectives :
  - How to use a catalogue browser for archive and Sentinel data;
  - How to download the images through the website and through automated download
- The Use case:
  - Using of Sentinel-1 imagery for a project on illegal fishing on the english channel;
  - Automation of the download of the data to streamline the project
  - Which data are freely available to test their method and review older cases of illegal fishing







### Search, select and download the data

Data Access

- Sentinel-1 data can be used to detect ships
- Lets browse S-1 data over the area of interest: the English Channel



		Gmail	il Images 🏭 🗨 🐇		
	Recherche Google J'ai de la chance				
Publicité Entreprise Àpropos		Confidentialité	Conditions	Paramètres	

Vessels







Access

### S-1 Products and operational monitoring

- The previous video shows many images available
- Different products and formats are available : SLC and GRD
- Sentinel-1 (S- 1) is the Synthetic Aperture Radar (SAR) satellite. Its images are useful for maritime surveillance, because medium and large ships can be detected.
- S-1 has four image modes, with different swath widths and resolutions.

Mode	Swath width (km)	Resolution of SLC product (m)	Resolution of GRDH product (m)	ENL of GRDH product
EW - Extra Wide	410	20 x 43	50 x 50	2.8
IW - Interferometric Wide	250	5 x 22	20 x 22	4.4
SM - Stripmap	80	5 x 5	23 x 23	29.7
WV - Wave	20	5 x 5	4	22

- SLC products have a better resolution than GRD products but it is difficult to work with (e.g: SLC image can reach several Gb while GRD are lighter: hundreds Mb)
- Tradeoff to find between "performance of detection VS image size
- In the concerned use-case, GRD is the most adapted





### Automatic download

Data Access

 To download automatically the data, you can find on the portal an exemple of script which will allow you to :

- Search products over a pre-defined AOI
- Filter the products by ingestion time, sensing time
- Filter the products by mission (Sentinel-1, Sentinel-2, Sentinel-3), instrument and product type
- Save the list of results in CSV and XML files
- Download the products
- Download the manifest files only
- Perform the MD5 integrity check of the downloaded products
- Go to <u>https://scihub.copernicus.eu/</u> and look the video.







# Registration for Copernicus Services

Copernicus Data Access





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Copernicus EU www.copernicus.eu



Access

### INTRODUCTION OF USE CASE

- Objectives of the presentation:
  - Reminder on the different Copernicus Services
  - Familiarize with Copernicus Services Registration
  - QuickStart guide
  - When do you need to register ?







Access

### DATA ACCESS SUBMODULE

- 5 services accessible
  - Marine  $\rightarrow$  full free and open access
  - Land  $\rightarrow$  full free and open access
- Atmosphere  $\rightarrow$  full free and open access
- Climate  $\rightarrow$  full free and open access
- Emergency Management  $\rightarrow$  Access subject to conditions

Even with full, free and open access, registration can be slightly different from one service to another.





Register



**Download** 

 Download • One-off or by scripts



Integrate

• Merge

62

Compute

COPERNICUS MARINE ENVIRONMENT MONITORING SERVICE

NEWS

ACCESS TO PRODUCTS

AREA PARAMETERS TIME COVERAGE OBSERVATIONS/M



• Get inspired

REGISTER

OLLABORATIVE 2

Join Up

-







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### CLMS Registration

Data Access

### • Copernicus Land Service: <u>http://land.copernicus.eu/</u>

- Implemented by EEA/JRC
- Data Policy: full free and open access
- When do you need to register ?



Copernicus Land Monitoring Services

The European Earth Observation Programm

(opernicus







Access

### CAMS registration

 Copernicus Atmosphere Service: <u>http://atmosphere.copernicus.eu/</u>

- Implemented by ECMWF
- Data Policy: full free and open access
- When do you need to register ?









Access

### CLIMATE CHANGE Registration

- Copernicus Climate Change Service: <u>http://atmosphere.copernicus.eu/</u>
- Implemented by ECMWF
- Data Policy: full free and open access



- Only a few datasets already available
- The "Climate Data Store" is under construction
- Sectoral Information system are being developed in several sectors: water/energy/insurance/health







Access

### EMS Registration process

- Emergency Management Service: <u>http://emergency.copernicus.eu/</u>
- Implemented by EC
- Data Policy: Depend on profile



- Authorised Users may trigger the service: National Focal Points (NFPs) in EU Member States and in countries participating in the European Civil Protection Mechanism as well as EC Services (DGs) and the Situation Room of the EEAS.
- **Associated Users** must coordinate with and go through the Authorised Users in order to trigger the service. Associated Users include local, regional and other public entities; International Governmental Organisations (e.g. UN agencies, World Bank), and National & International Non-Governmental Organisations; entities and institutions within the EEAS sphere such as EU Delegations, the INTCEN, the EU Satellite Centre.
- **General Public Users** are not authorised to trigger the service, but can be informed of an activation request through the web portal. Activations, for which sensitivity restrictions apply, are excluded.





Access

### EMS Registration process

- For General public users: No registration to get maps
- Under Rapid Mapping:
  - Click on List of Activations
  - Search by Activation Status, Event Type, Date or Country
  - Click on the event of interest.
  - Download the available maps.
- Under Risk and Recovery:
  - click on List of Activations
  - Search by Activation Status, Event Type, Date or Country
  - Click on the event of interest
  - Download the available maps




Data

Access

# EMS Registration process

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# Navigation in Time Series Viewer

Copernicus User Uptake Information Sessions Data Access

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f Copernicus EU

Copernicus EU

Space





Data

Access

## Introduction to time series viewer use case

- Objective
  - How to view charts and maps in a time series viewer of Copernicus Land Cover data.
  - How to navigate in the time series viewer and get relevant information
- Use case
  - A government has put in a lot of effort in improving vegetation health and abundance in their country over the past few years.
  - How their actions have impacted the tree cover and natural vegetation over the last years?
  - What is the status of tree cover and natural vegetation in neighbouring countries?





Data

Access

## What is a time series viewer?

- Satellite missions have been capturing the earth on a daily basis for more than 15 years. This has accumulated into a treasure trove of information on how regions in the world have evolved over this period.
- One of the applications offered in the PROBA-V Mission Exploitation Platform, is the 'Time Series Viewer' which unlocks the information in remote sensing archives, by enabling interactive querying on precomputed time series datasets.
- "Precomputed" means that this application does not provide information at the level of individual pixels, but at a higher level of regions and countries as follows:
  - All CCI land covers for GAUL level 1 administrative regions, for instance: grassland in provinces or states of a country.
  - GAUL level 1 administrative regions
  - All CCI land covers for all countries of the world (GAUL level 0)
  - All countries of the world.





# Launching the Proba-V time series viewer

- This application allows to explore and view charts and maps of:
  - PROBA-V time series, derived indicators for vegetation and environmental monitoring from the Copernicus Global Land Service
  - Rainfall data from CHIRPS.
- Tool under development
- <u>http://viewer.globalland.vgt.vito.be/tsviewer/</u>







# Welcome to the time series viewer

Data Access



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0 Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec

- FAPAR\_V1 --- FAPAR\_V1 Min --- FAPAR\_V1 Max -- FAPAR\_V1 LTA



COPERTICUS Europes reys on Earth



Data Access

• Monitoring vegetation health and abundance over the past few years in Greece

Video 1

- Period: 2013-2016
- Greenness indicator: NDVI
- Meteo parameter: Rainfall
- Country selection: Greece
- How to view details per regions or per months in Video 2
- How to extract or download information and charts? Video 3
- Download information per land cover classes:
  - Tree cover and shrubs
  - Mosaic of natural vegetation classes











# Togofurther...

Data Access

- Repeat the same exercise to compare with another country
- Easy, free open access to citizens
- User guide, tutorials and manuals are available on:

https://proba-v-mep.esa.int/documentation/manuals/time-seriesviewer





# Downloading a subset of data

(f) Copernicus EU

Copernicus EU

Space

Copernicus User Uptake Information Sessions Data Access / Marine Monitoring

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Data

Access

# INTRODUCTION OF USE CASE

- 2 objectives :
  - Show how to access ocean colour CMEMS products using a python procedure
  - Download a subset
- The Use case:
  - Monitoring ocean colour in the Baltic Sea to evaluate the presence of algae bloom, suspended matter in sea water...





## The CMEMS web site: Access

- Go to the website of the Copernicus Marine Environment Service: <u>http://marine.copernicus.eu</u>
- Registration process :
  - Read the Service Commitments and License
  - Complete the registration (user details, type of your organization, organization details, areas of relevance etc..)
  - Service Level Agreement acceptance
  - Click on send
- Look your mailbox  $\rightarrow$  an email of the CMEMS Service Desk with
  - Your Login and Password
  - First information
  - Links for tutorials





# CMEMS product: The registration process





# CMEMS catalogue: selection

- Search for ocean colour products in the Baltic Sea:
  - Overview of ocean colour products (model and observations) and related parameters;
  - Choose a product displaying NRT ocean colour from satellite observation;
  - Access the python command line example and adapt it to the final request;
  - Visualize and compare to L1/L2 ocean colour products available.





Data Access

## CMEMS catalogue: selection

# • Search for Ocean Colour products :

- Overview of Ocean
  Colour products (model and observations) and related parameters;
- Choose a product displaying NRT ocean colour from satellite observation;





Data Access

• Paste the python command line example and adapt it to the final request

Indicate the directory paths where *python* and *motu* are placed

path\_to\_your\_python\_bin\_directory/python

path\_to\_your\_motu\_python\_script\_directory/motu-client.py -u login -p password -m

http://cmems.isac.cnr.it/mis-gateway-servlet/Motu -s

OCEANCOLOUR\_BAL\_CHL\_L3\_NRT\_OBSERVATIONS\_009\_049-TDS -d dataset-oc-bal-chlmodis\_a-l3-nn\_1km\_daily-rt-v01 -x 9.25 -X 30.25 -y 53.25 -Y 65.85 -t "2016-10-26" -T "2016-10-29" -v CHL -o *output\_directory* -f *output\_file\_name* --proxy-server your\_proxy\_server\_url:your\_proxy\_port\_number --proxy-user your\_proxy\_user\_login -proxy-pwd your proxy user password





Data Access

Adapt the python command line

Indicate your CMEMS login and password

path\_to\_your\_python\_bin\_directory/python path\_to\_your\_motu\_python\_script\_directory/motu-client.py u login -p password-m http://cmems.isac.cnr.it/mis-gateway-servlet/Motu -s OCEANCOLOUR\_BAL\_CHL\_L3\_NRT\_OBSERVATIONS\_009\_049-TDS -d dataset-oc-bal-chlmodis\_a-l3-nn\_1km\_daily-rt-v01 -x 9.25 -X 30.25 -y 53.25 -Y 65.85 -t "2016-10-26" -T "2016-10-26" -v CHL -o output\_directory -f output\_file\_name --proxy-server your\_proxy\_server\_url:your\_proxy\_port\_number --proxy-user your\_proxy\_user\_login -proxy-pwd your\_proxy\_user\_password





Data Access

Adapt the python command line

Indicate the longitude min and max

Indicate the **latitude** min and max

path\_to\_your\_python\_bin\_directory/python path\_to\_your\_motu\_python\_script\_directory/motu-client.py -u login -p password -m http://cmems.isac.cnr.it/mis-gateway-servlet/Motu -s OCEANCOLOUR\_BAL\_CHL\_L3\_NRT\_OBSERVATIONS\_009\_049-TDS -d dataset-oc-bal-chlmodis\_a-l3-nn\_1km\_daily-rt-v01 -x 9.25 -X 30.25 -y 53.25 -Y 65.85 -t "2016-10-26" -T "2016-10-26" -v CHL -o output\_directory -f output\_file\_name --proxy-server your\_proxy\_server\_url:your\_proxy\_port\_number --proxy-user your\_proxy\_user\_login -proxy-pwd your\_proxy\_user\_password





Data Access

Adapt the python command line

Indicate the start date and the end date of the dataset

path\_to\_your\_python\_bin\_directory/python path\_to\_your\_motu\_python\_script\_directory/motu-client.py -u login -p password -m http://cmems.isac.cnr.it/mis-gateway-servlet/Motu -s OCEANCOLOUR\_BAL\_CHL\_L3\_NRT\_OBSERVATIONS\_009\_049-TDS -d dataset-oc-bal-chlmodis\_a-l3-nn\_1km\_daily-rt-v01 -x 9.25 -X 30.25 -y 53.25 -Y 65.85 t "2016-10-26" -T "2016-10-29" -v CHL -o output\_directory -f output\_file\_name --proxy-server your\_proxy\_server\_url:your\_proxy\_port\_number --proxy-user your\_proxy\_user\_login -proxy-pwd your\_proxy\_user\_password





Data Access

Adapt the python command line

Indicate the names of the directory and the output file

path\_to\_your\_python\_bin\_directory/python path\_to\_your\_motu\_python\_script\_directory/motu-client.py -u login -p password -m http://cmems.isac.cnr.it/mis-gateway-servlet/Motu -s OCEANCOLOUR\_BAL\_CHL\_L3\_NRT\_OBSERVATIONS\_009\_049-TDS -d dataset-oc-bal-chlmodis\_a-l3-nn\_1km\_daily-rt-v01 -x 9.25 -X 30.25 -y 53.25 -Y 65.85 -t "2016-10-26" -T "2016-10-29" -v CHL -q output\_directory -f output\_file\_name\_\_-proxy-server your\_proxy\_server\_url:your\_proxy\_port\_number --proxy-user your\_proxy\_user\_login -proxy-pwd\_your\_proxy\_user\_password





Data Access

#### Adapt the python command line

path\_to\_your\_python\_bin\_directory/**python** path\_to\_your\_motu\_python\_script\_directory/**motu-client.py** -u login -p password -m http://cmems.isac.cnr.it/mis-gateway-servlet/Motu -s OCEANCOLOUR\_BAL\_CHL\_L3\_NRT\_OBSERVATIONS\_009\_049-TDS -d dataset-oc-bal-chl-modis\_a-l3nn\_1km\_daily-rt-v01 -x 9.25 -X 30.25 -y 53.25 -Y 65.85 -t "2016-10-26" -T "2016-10-29" -v CHL -o output\_directory -f output\_file\_name -**proxy-server** your\_proxy\_server\_url:your\_proxy\_port\_number

--proxy-user your\_proxy\_user\_login --proxy-pwd your\_proxy\_user\_password

[2] - If **you use an HTTP proxy**, replace the value by your proxy url and port number: e.g. 'http://myproxy.org:8080'. If you don't use HTTP proxy, remove this option.

[3] - If **you use an HTTP proxy with authentication**, replace the value by your login and password. If you don't need to authenticate to your proxy, remove these options.

Execute the command line into a terminal window





# CMEMS : CMEMS L4 versus L2 products





# Data Access

Things to Remember







www.copernicus.eu



## Data Access: Things to remember

