ESA EO Data Access Training course 2021

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30/04/2021

Contents: ESA EO and Copernicus data access

HERITAGE Missions (ERS-1,2 and ENVISAT)
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Access to ESA and ESA TPM and Visualization tool
- Data policy and EO Sign-In registration
- Access via EO-CAT
- Other data access mechanism examples (free and restricted)
- EEs access, AOs   and visualization tool

Access to Copernicus Sentinels Data (focusing on Copernicus hub)
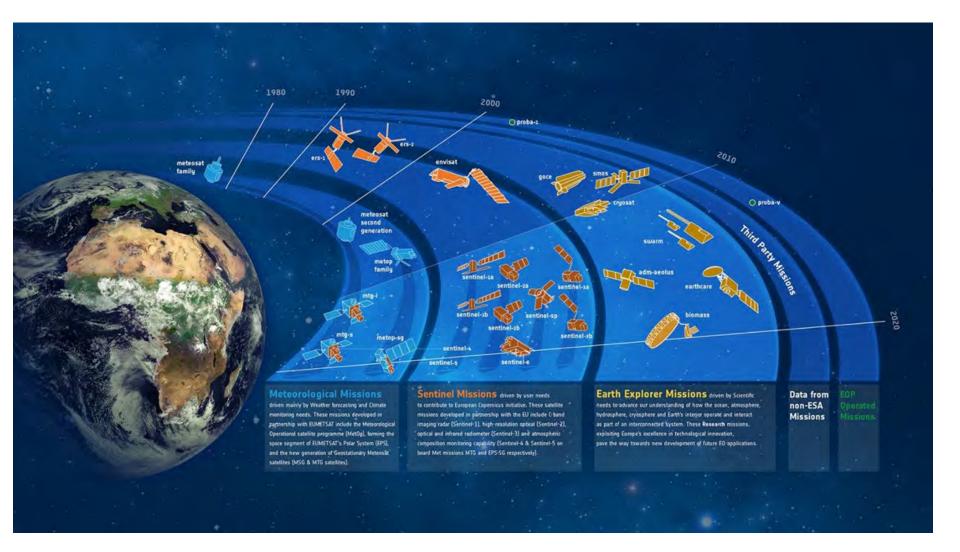- Data Policy and use typologies (focusing on scientific users)
- Sentinel Data data hub (registration, search and download)
- Sentinel 3 and EUMETSAT CODA hub
- DIAS and other hubs to access Sentinels data

- **RUS service introduction**

- **ESA Toolboxes and App**

European Space Agency

Heritage Mission: ERS

The European Remote Sensing satellite ERS-1, launched in 1991, carried a comprehensive payload including an imaging synthetic aperture radar, a radar altimeter and other powerful instruments to measure ocean surface temperature and winds at sea. ERS-2, which overlapped with ERS-1, was launched in 1995 with an additional sensor for atmospheric ozone research.
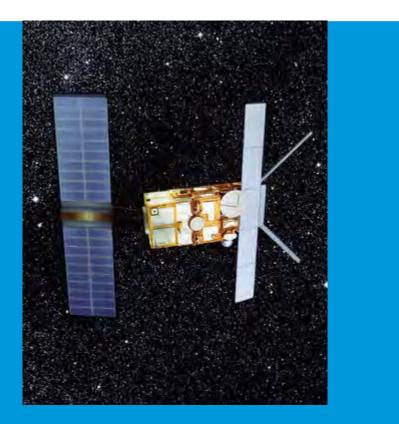
Instruments:

Active Microwave Instrument (AMI)
The Active Microwave Instrument is the largest onboard system and combines the functions of a Synthetic Aperture Radar (SAR)

Radar Altimeter (RA)
This measures variations in the satellite's height above sea level and ice with an accuracy of a few centimetres and helps provide data to know the satellite's exact orbital position
AATSR (Advanced Along Track Scanning Radiometer)

Along-Track Scanning Radiometer (ATSR)
The ATSR consists of two instruments, an Imaging Infrared Radiometer (IIR) and a passive Microwave Sounder (MS).

Global Ozone Monitoring Experiment (GOME)
In the light of the increasing concern about atmospheric ozone levels, the GOME instrument was added to the ERS-2 payload.
GOMOS (Global Ozone Monitoring by Occultation of Stars)

Heritage Mission: ENVISAT

Envisat had 10 instruments to provide continuous observation and monitoring of Earth's land, atmosphere, oceans and ice caps was the largest Earth observation spacecraft ever built

Instruments:

ASAR (Advanced Synthetic Aperture Radar)

MERIS (Medium Resolution Imaging Spectrometer)

AATSR (Advanced Along Track Scanning Radiometer)

SCIAMACHY (an imaging spectrometer whose primary mission objective was to perform global measurements of trace gases in the troposphere and stratosphere)

RA-2 (Radar Altimeter, an instrument determining the two-way delay of the radar echo from Earth's surface)

GOMOS (Global Ozone Monitoring by Occultation of Stars)

MWR (Microwave Radiometer)
DORIS (Doppler Orbitography and Radio Positioning Integrated by Satellite)
LRR (Laser Retro Reflector)
MIPAS (Michelson Interferometer for Passive Atmospheric)

SMOS

The Soil Moisture and Ocean Salinity (SMOS) mission, launched on 2 November 2009, is exploiting an innovative two-dimensional interferometer to acquire brightness temperature observations at L-band (1.4 GHz). These observations translate into information on the moisture held in soil and salinity in the surface layers of the oceans, which are needed to further our understanding of Earth's water cycle (still in operation)

GOCE

The Gravity field and steady-state Ocean Circulation Explorer (GOCE) was launched on 17 March 2009 and ended on 11 November 2013. GOCE provided high spatial resolution gravity-gradient data to improve global and regional models of Earth's gravity field and geoid

CryoSat

CryoSat, launched on 8 April 2010, is measuring fluctuations in the thickness of ice on both land and sea determine how Earth's ice is changing. This information is leading to a better understanding of the relationship between ice and global climate. CryoSat carries an innovative SAR/interferometric radar altimeter (still in operation)

Swarm

Swarm, launched on 22 November 2013, is providing the best-ever survey of the geomagnetic field and its temporal evolution. The geomagnetic models resulting from the mission will provide new insights into Earth's interior. This information will lead to a better understanding of atmospheric processes, and also have practical applications in areas such as space weather and radiation hazards (still in operation)

Aeolus

The prime aim of the Atmospheric Dynamics Mission is to demonstrate measurements of vertical wind profiles from space. The mission employs a high-performance Doppler wind lidar based on direct-detection interferometric techniques. ADM-Aeolus was launched in August 2018 (still in operation)

Coming soon: **EARTHCARE (2022) ,BIOMASS (2022), FLEX etc.**

Full information on EEs at

https://www.esa.int/Applications/Observing_the_Earth/The_Living_Planet_Programme/Earth_Explorers/About_Earth_Explorers2

ESA EO Third Party Missions (TPM)

ESA uses its multi-mission ground systems to acquire, process, distribute and archive data from other satellites (owned by either public or private entities outside or within Europe) – known as Third Party Missions.
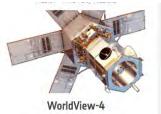
Details of the Third Party Missions currently supported by ESA can be found on:
https://earth.esa.int/web/guest/pi-community/apply-for-data/3rd-party

and

https://earth.esa.int/eogateway/search?text=&category=Missions&subFilter=third%20party%20missions&sortby=RELEVANCE

PROBA-1
PROBA-1 is a technology demonstration satellite that later became an operational Earth observation mission.

WorldView-4
WorldView-4 was an imaging and environment-monitoring satellite from DigitalGlobe of the United States, which...

WorldView-1
WorldView-1 helped meet the growing commercial demand for multi-spectral geospatial imagery.

PAZ
The PAZ (Spanish for "peace") satellite, operates as a constellation alongside TerraSAR-X and TanDEM-X.

IRS-1C and IRS-1D
The Indian Remote Sensing satellites IRS-1C and IRS-1D were identical Earth-imaging satellites operated by the Indian Space...

GOSAT Series
The GOSAT series is composed of two environment-monitoring satellites developed by JAXA dedicated to the observation of...
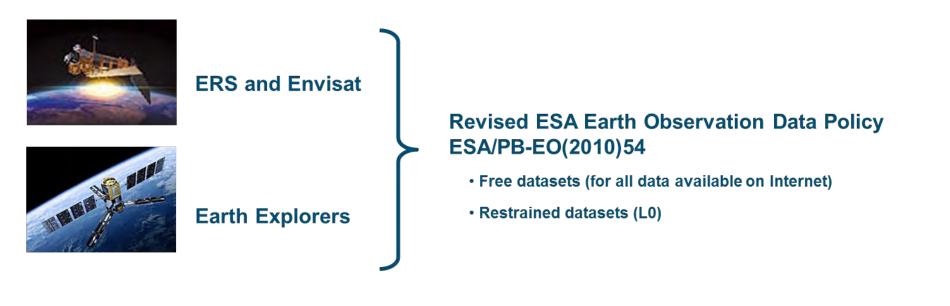
Landsat Series
The Landsat series is the world's longest running system of satellites for moderate-resolution optical remote sensing for land,...

WorldView Series
The WorldView constellation are environment-monitoring satellites, from DigitalGlobe, have been supplying imagery since 2007.

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Data Policy (1/2)

ERS and Envisat

Earth Explorers

Revised ESA Earth Observation Data Policy ESA/PB-EO(2010)54

- Free datasets (for all data available on Internet)
- Restrained datasets (L0)

Sentinels

Copernicus (GMES) Data Policy, Joint Principles for Sentinel Data Policy [ESA/PB-EO(2013)30, rev.1]
- Free, full and open data policy

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EO Sign In **registration** **needed**

(for some TPMs
EO Sign In **+ project proposal**)

proposal)

Copernicus hub self **registration**

No registration (from June 2018)

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EO Sign In account Registration & Log in (1/2)

The EO Sign In account allows the PI to access to *My Earthnet* functionality.

If you **do not** have an EO Sign In account, follow the registration procedure starting from **ESA PI Community** website : https://earth.esa.int/web/guest/pi-community

Step 1 – Click *'Login My Earthnet'* button at the top of the page

Step 2 - Click the 'Register now' button to proceed with your EO Sign In registration

https://eoiam-idp.eo.esa.int/

Step 3 – **Enter a valid email address as username**

Step 4 - Fill in the registration form with your prospective account details

itions data +EOSign

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eo sign in
Earth
Online
Contact
Us

Enter your email as username here

Username *

PROCEED T

Step 5 – Your new ac
receive an automated
Simply click on the "C
and your registration

https://eoiam-idp.eo.esa.int/accou

https://mail.google.com/mail/u/0/

ESA EO Sign In – Act

eohelp@esa.int
a me

Dea

You
raff
Plea

In case of issues, you can copy and paste the following link into your
browser:
https://eoiam-idp.eo.esa.int/accountrecoveryendpoint/confirmregistration.do?
confirmation=5902c0f1-2203-4b14-8b64-7e5bdh38efc2&usersforedomain=PRIMARY&

User Consents

ESA_Earth_Online application requests access to your profile information

By selecting following attributes I agree to share them with the above service provider.

☑ Select All

☑ Country of residence *

☑ Last Name *

☑ Contact Email *

☑ Institution *

☑ First Name *

☑ Username *

Mandatory claims are marked with an asterisk (*)

APPROVE

DENY

·ees

il.com

ions for the Utilisation of

ions for the Utilisation of

dpoint/privacy_policy.do

ESA TPM T&C **https://http://earth.esa.int/files/TPMterms**

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Accessing ESA Missions (ERS & ENVISAT and ESA TPMs) through the ESA **EO CAT** (1/2)

https://eocat.esa.int/sec/#data-services-area

EO-CAT is the ESA EO Catalogue application and is the main visible part of the whole ESA catalog system. EO-CAT is designed to manage end-user Earth Observation services. Using EO Catalogue Services, you can browse the metadata and images of Earth Observation data acquired by various satellites and download data belonging to ESA and ESA TPM collections only with your ESA EO Sign In account
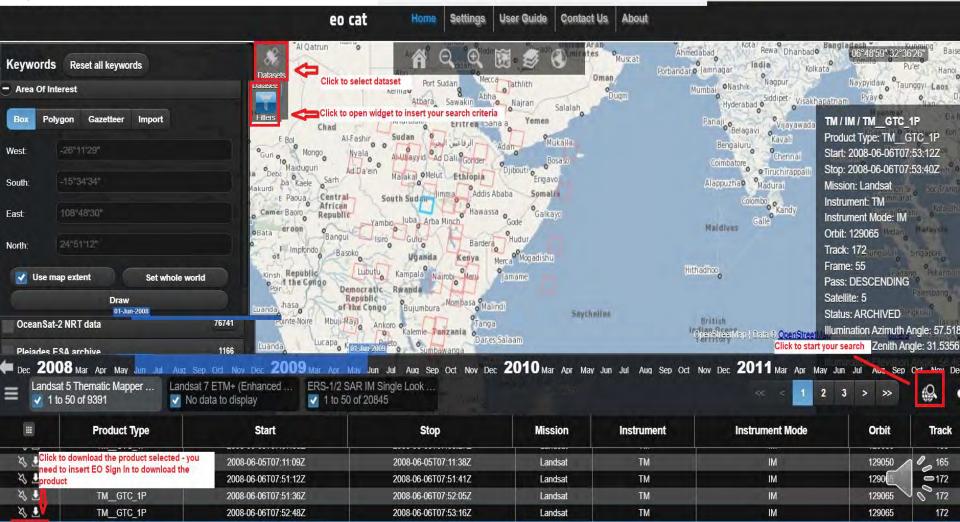
Accessing ESA Missions (ERS & ENVISAT and ESA TPMs) through the ESA **EO CAT** (2/2)

The first and necessary step to make a catalogue search is to choose at least one dataset. Once at least one dataset has been selected, to set the **search criteria**, the user has to click on the 'Filters' button at the bottom of the 'Datasets' button. The search criteria widget is then displayed. You can select for example 'Acquisitions Dates' (using time slider) AOI (using map extent). Select product of interest and click download . For full details see User Guide ->https://eocat.esa.int/sec/help.html

https://eocat.esa.int/sec/#data-services-area

ESA Missions (ERS & ENVISAT,EEs and ESA TPMs) product details

https://earth.esa.int/eogateway/search?skipDetection=true&text=&category=Data

Accessing ESA Missions (ERS & ENVISAT ,EEs and ESA TPMs) – **ASAR L1** data

https://earth.esa.int/eogateway/catalog/envisat-asar-im-single-look-complex-l1-asa_ims_1p-?text=ASAR+L1

EO Sign In account needed

ENVISAT & ERS 1/2 (A)SAR On-The-Fly (OTF) Processing

For help, refer to
ASAR-OTF-User Manual.pdf
&
ASAR-OTF-FAQ

ERS & ENVISAT SAR and ASAR Data Download (L1 and L0)

- Registration\ log in
- Acceptance of terms and conditions
- Product download through ESAR online dissemination server:

EO Sign In account needed
For L0 EO Sign In account and Data Service Request

https://esar-ds.eo.esa.int/oads/access/collection

Welcome to ESA Online Dissemination

The ESA EO products online search service is a collection-based functionality; available collections data can be searched and accessed.

Collection	Information page
ASA_IM__0P - Level 0 Scenes product for ENVISAT ASAR Image Mode	Info
ASA_IMS_1P - Level 1 product for ENVISAT ASAR Image Mode	Info
ASA_IMP_1P - Level 1 product for ENVISAT ASAR Image Mode	Info
ASA_AP__0P - Level 0 Scenes product for ENVISAT ASAR Alternate Polarisation Mode	Info
ASA_APS_1P - Level 1 product for ENVISAT ASAR Alternating Polarisation	Info
ASA_APP_1P - Level 1 product for ENVISAT ASAR Alternating Polarisation	Info
ASA_WS__0P - Level 0 Scenes product for ENVISAT ASAR Wide Swath Mode	Info
ASA_WSS_1P - Level 1 product for ENVISAT ASAR Wide Swath	Info
SAR_IM__0P - Level 0 Scenes data for ERS SAR	Info
SAR_IMS_1P - Level 1 product for ERS SAR	Info
SAR_IMP_1P - Level 1 product for ERS SAR	Info
SAR_IMM_1P - Level 1 Medium Resolution product for ERS SAR	Info

esar-ds.eo.esa.int/socat/ASA_IM__0P_Scenes

ESA Online Catalogue - Search Form

back to collections
Collection ASA_IM__0P_Scenes
Level 0 products for ENVISAT ASAR Image Mode
More information can be found in this page.
Fill in your selection criteria search the matching products.

Format	HTML search response.
Items per page	10
Geograpical coverage	Lat-Min / Lon-Min / Lat-Max / Lon-Max / Clear
Acquisition date	from start date to stop date / Clear
Orbit number	from minimum value to maximum value / Clear
Orbit direction	select values / Clear

**some specific datasets (e.g RAW/L0) are available upon positive evaluation of the data service request

DATA SERVICE REQUEST for ERS & ENVISAT SAR and ASAR L0 Data Download and for some ESA TPM (DEIMOS-1/2, RADARSAT-1/2)
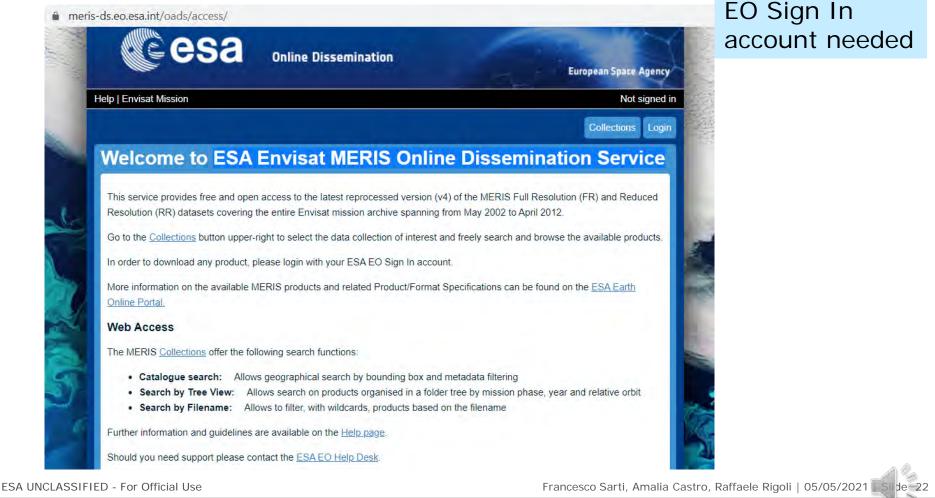

Since June 2019 ESA has simplified the procedure to apply for RADARSAT and DEIMOS-1/2 TPM data by including them to the Data Service request.

MERIS - My Online Data (Free Dataset) Access Using your EO Sign In account ESA Envisat MERIS Online Dissemination Service

Support to the access to the selected Online data, is provided by ESA EO Help & Order Desk.
https://meris-ds.eo.esa.int/oads/access/

EO Sign In account needed

ENVISAT/ERS **(A)ATSR** - My Online Data (Free Dataset) Access Using your EO Sign In

Support to the access to the selected Online data, is provided by ESA EO Help & Order Desk. the (A)ATSR regional extraction tool. This site provides you with services for accessing ERS-1, ERS-2 and Envisat (A)ATSR data products. https://ats-merci-ds.eo.esa.int/merci/welcome.do

EO Sign In account needed

Third Party Mission Data Access via ESA

EO Sign In account needed

Some specific TPM restricted access (available for free with a limited quota assigned to ESA): EO Sign In and then Project proposal submission

In The PI Community website at :
https://earth.esa.int/web/guest/pi-community/apply-for-data/3rd-party
You will find the list of all info areas for each of the active TPM reporting access conditions and terms of applicability. For some of them only a limited quota can be assigned to each proposal
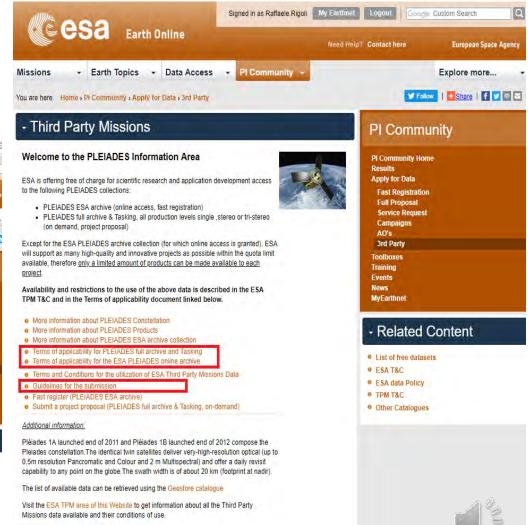
Example PLEIADES access info page

Project proposal for some specific TPM restricted
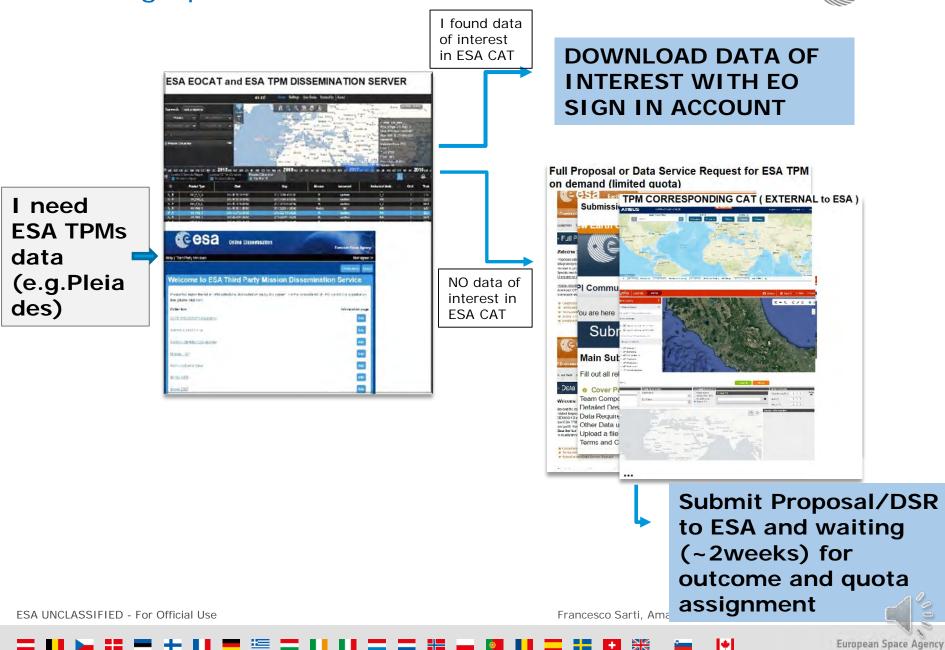
Some TPMs access is available for free **with a limited quota assigned** by ESA after project proposal evaluation): register for ~~EO Sign In and then submit a Project proposal~~

Geographic restrictions for TPM on demand since Jan. 2021   (accessible to PIs resident in EUROPE, ESA member states and Canada)

For further detail on the ~~project proposal~~ ~~submission process refer~~ ~~to the general guidelines~~ ~~available at:~~

~~https://earth.esa.int/files/~~ ~~guidelines~~

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Summing up flow for ESA TPMs

I found data of interest in ESA CAT

DOWNLOAD DATA OF INTEREST WITH EO SIGN IN ACCOUNT

I need ESA TPMs data (e.g.Pleiades)

NO data of interest in ESA CAT

Full Proposal or Data Service Request for ESA TPM on demand (limited quota)

TPM CORRESPONDING CAT (EXTERNAL to ESA)

Submit Proposal/DSR to ESA and waiting (~2weeks) for outcome and quota assignment

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EEs DATA ACCESS Keep in mind from last year…

Earth Observation data distribution services improvement

ESA has started a process to improve the Earth Observation data distribution services, aiming at facilitating access to data and information for the end users, initially by shortening the access path and reviewing authentication and authorisation processes.

This improvement concern first the **Earth Explorers** GOCE, CryoSat and Swarm (SMOS coming soon) data access through the setting-up of a simplified procedure **leading the users straight to the product repository** without affecting the current data retrieval method itself.

GOCE:http://eo-virtual-archive1.esa.int/Index.html

SMOS*:https://smos-diss.eo.esa.int/
EO_SSO account registration still needed to download SMOS data

SWARM:https://swarm-diss.eo.esa.int/

CRYOSAT:http://science-pds.cryosat.esa.int/

AEOLUS**:http://aeolus-ds.eo.esa.int

**For the time being, data download is only allowed to selected users (Developers, Cal/Val users) . Free and open access to general public will be allowed at a later stage*

EEs virtual archive example (data access without registration): SWARM

EEs access (data access with EO-Sign id registration): SMOS

EO Sign In account needed to log-in and download the data

smos-diss.eo.esa.int/oads/access/

ESA SMOS Online Dissemination

Help | SMOS Mission

Welcome to

This service provides a
Near Real Time, and to

The operational and re
browsed for, following t

In order to download ar
one beforehand (Start r

Detailed information on
Format Specifications a

Web Access:

You can search and bro
to be **logged in** in orde

A **Simple Online Catal**
available) and *file form*

FTP Access:

SMOS products can als
your own EO-SSO cred

In addition to the Earth
NetCDF format under th

smos-diss.eo.esa.int/socat/SMOS_Open/search

ESA SMOS Online Dissemination

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Help | SMOS Mission

ESA SMOS Online Catalogue - Search Result

back to search form | bulk download lists

1 2 3 ›

Collection SMOS_Open

SMOS L1 and L2 Science data (more information can be found in this page)

Search result page 1 of more than 6 pages (10 of more than 60 records found in 3.138 seconds).

Data © OpenStreetMap contributors and others. Rendering © EOX.

SM_OPER_MIR_SMUDP2_20191014T163825_20191014T173139_650_001_1.zip

Download Product | Product Info | Browse

SM_OPER_MIR_SMUDP2_20191013T030638_20191013T035957_650_001_1.zip

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ACCESS TO SMOS L3 and L4 PRODUCTS

The Barcelona Expert Centre (BEC) was created in 2007, as a joint initiative between the Spanish Research Council (CSIC) and the Universitat Politècnica de Catalunya (UPC), to provide support to the Spanish SMOS-related activities. BEC provides FTP access to SMOS L3 e L4 that can be requsted ,by simple registrations at http://bec.icm.csic.es/

Barcelona Expert Center
REMOTE SENSING RESEARCH, DATA DISTRIBUTION AND VISUALIZATION SERVICES

HOME   BEC PRODUCTS   REMOTE SENSING SPECIAL ISSUE   CONTACT   ABOUT BEC   PROJECTS

BEC
Barcelona Expert Center
ICM   IEEC⁹
CSIC   UAB

Print This Post

NEW RELEASE OF EUROPE SMOS L4 SOIL MOISTURE AT 1 KM
Posted on August 1, 2019

We are pleased to release the latest version of the cloud-free BEC L4 soil moisture at 1 km over Europe. The L4 soil moisture v4 maps are produced from the synergy of:

- SMOS L1C brightness temperature,
- European Center for Medium Weather Forecast (ECMWF) land surface temperature (LST),
- Terra Moderate Resolution Imaging Spectroradiometer (MODIS) Normalized Difference Vegetation Index (NDVI).

The downscaling technique uses the BEC L3 soil moisture v3 as benchmark. A detailed explanation of the downscaling algorithm and the resulting product is included in **BEC Land Products Description**

New L4 Soil Moisture At 1 Km
SMOS L4 Soil Moisture product v4.0 is available!
Read more...
NEW PRODUCT

Extended Deadline Special Issue: 30 December 2019
The Remote Sensing Journal and BEC have organized a Special Issue entitled "Ten Years of Remote Sensing at Barcelona Expert Center".
Read more..

FTP Access

Available Variables:

SMOS Sea Surface Salinity

SMOS Sea Ice

Singularity Exponents

SMOS Surface Soil Moisture

Details in the product documentation:

http://bec.icm.csic.es/products-documentation/

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Global Gravity Field Models

A primary objective of the GOCE mission was to map the ocean's time mean circulation globally in unprecedented detail. The final GOCE geoid based on 42 months of gravity observations. The level-2 data are the fundamental products that will be available to users worldwide. They consist of a spectral representation of the gravity potential on a sphere, gridded values of geoid heights and gravity anomalies, including error information and calibrated gravity-gradients in different reference frames. ICGEM (International Centre for Global Earth Models http://icgem.gfz-potsdam.de) provides an extensive table of links to download main global geopotential model coefficients.

EEs access to selected users (Cal/Val): AEOLUS

Submit a proposal (EO Sign In needed) for Cal/Val access to Aeolus data :
https://earth.esa.int/aos/aeoluscalval

If the proposal is accepted by ESA
(Aeolus Scientific review Board)
PI can download the data from the ESA Aeolus online dissemination server:
http://aeolus-ds.eo.esa.int/

ESA Announcement of Opportunities :

EO Sign In registration (prerequisite)

ESA issues research announcements at regular intervals (e.g. for new Missions or specific agreement with other Agencies) Open opportunities for Researchers . Also in this case a project proposal is needed under a pre defined scheme and to submit it you need EO Sign In account.

Open Opportunities for Researchers

Aeolus Cal/Val

ESA is pleased to announce the reopening of the Announcement of Opportunity (AO) call for the Aeolus Mission.

S5PVT

Within the framework of its Copernicus missions, ESA is pleased to announce the Sentinel-5 Precursor Calibration and Validation Team Call.

OSEO

The Open Science Earth Observation (OSEO) call offers to scientists the opportunity to exploit at no cost a full archive of optical EO data for science, applications and technological innovation, by offering services which exploit state of the art ICT.

S3VT

The S3VT call is open to relevant and interested groups and individuals worldwide; group responses are particularly welcome.

G-POD

ESA is offering all scientists with the possibility to perform bulk processing exploiting the large ESA Earth-observation archive together with ESA available GRID computing and dynamic storage resources.

ESA Announcement - full list of current Calls:

AOs	direct URL info area	Status
Sentinel-6 Validation team Call	https://earth.esa.int/aos/s6vt	on - EO Sign In login required to submit a proposal
Sentinel-3 Validation team Call	https://earth.esa.int/aos/s3vt	on - EO Sign In login required to submit a proposal
Sentinel-5P Validation Team Call	https://earth.esa.int/aos/s5pvt	on - EO Sign In login required to submit a proposal
Aeolus Cal Val	https://earth.esa.int/aos/AeolusCalVal	on - EO Sign In login required to submit a proposal
NoR Resouce Tier	https://eo4society.esa.int/sponsorship/	on - EO Sign In login required to submit a proposal
NoR Platform Service	https://eo4society.esa.int/sponsorship/	on - EO Sign In login required to submit a proposal
G-POD	https://earth.esa.int/aos/g-pod	on - EO Sign In login required to submit a proposal
SPIRE - ESA TPM under assessment	https://earth.esa.int/aos/spire	on - EO Sign In login required to submit a proposal
GHGSAT - ES TPM under assessment	https://earth.esa.int/aos/ghgsat	on - EO Sign In login required to submit a proposal

ESA and ESA TPM data access mechanisms to resume:
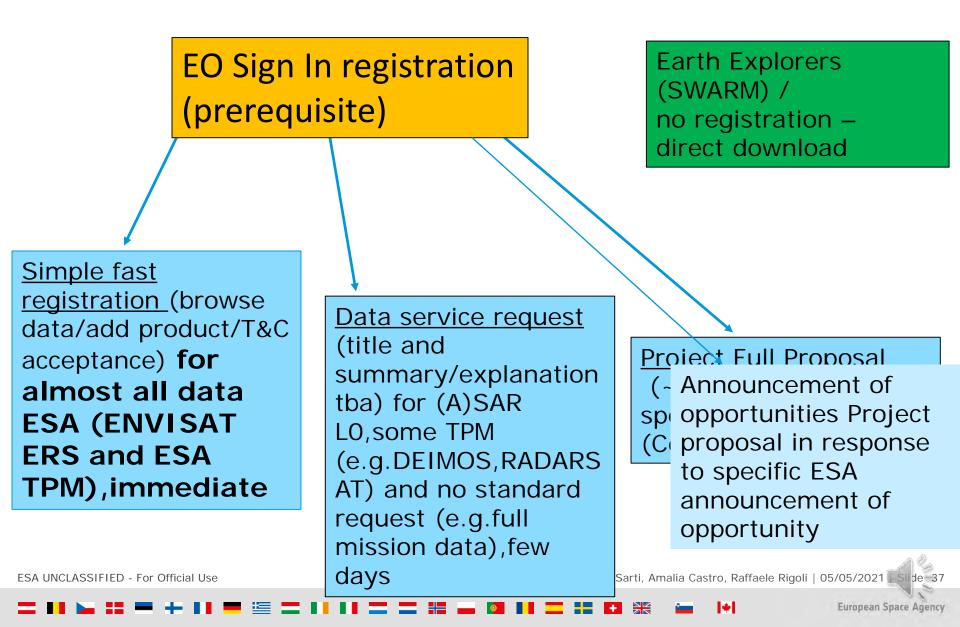
EO Sign In registration (prerequisite)

Earth Explorers (SWARM) / no registration – direct download

<u>Simple fast registration</u> (browse data/add product/T&C acceptance) **for almost all data ESA (ENVISAT ERS and ESA TPM),immediate**

<u>Data service request</u> (title and summary/explanation tba) for (A)SAR L0,some TPM (e.g.DEIMOS,RADARSAT) and no standard request (e.g.full mission data),few days

<u>Project Full Proposal</u> (~ sp (C

Announcement of opportunities Project proposal in response to specific ESA announcement of opportunity

HEDAVI – the EO data visualization tool for ESA EO Heritage Missions

http://hedavi.esa.int/

Copernicus (Sentinels) Data Policy

Copernicus Data Policy for Sentinels Missions

- ❑ The Copernicus data policy is adopted via a Delegated Regulation

- ❑ This policy promotes the access, use and sharing of Copernicus information and data on a full, free and open basis

- ❑ One of the main objectives is to support downstream segment and research, technology and innovation communities

- ❑ The European research institutes will be able to make the best use of these data to create innovative applications and services

> **Sentinel Data Policy = full and open access to Sentinel data to all users**

In practical terms
- Anybody can (has the right to) access acquired Sentinel data
- Licenses for the Sentinel data are free of charge
- Online access with users registration including acceptation of T&C*
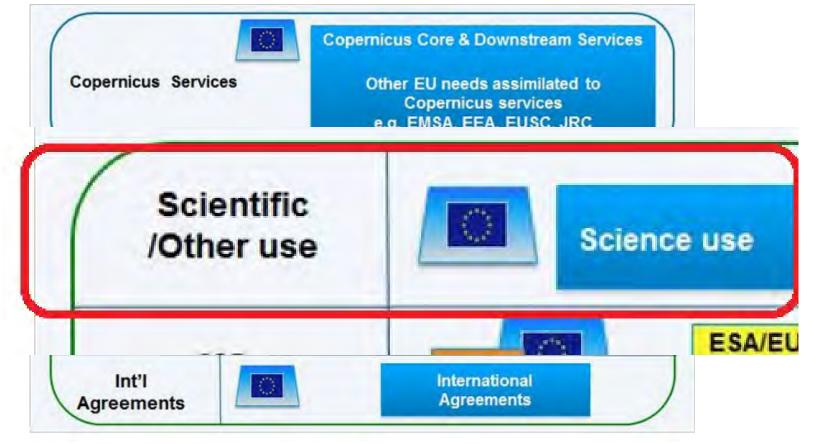
TERMS AND CONDITIONS FOR THE USE AND DISTRIBUTION OF SENTINEL DATA available online on the Sentinel website (https://sentinel.esa.int/documents/247904/690755/Sentinel_Data_Legal_Notice)

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Sentinel data access : use typologies and the corresponding services/data access (overview)

The following use typologies are defined for access to Sentinel data:

Register for use by Copernicus services via CSCDA→http://copernicusdata.esa.int/web/gsc/user-tools-guidelines
Register for <u>Other/Scientific use </u>via Sentinel-1 Scientific Data hub->https://scihub.copernicus.eu/
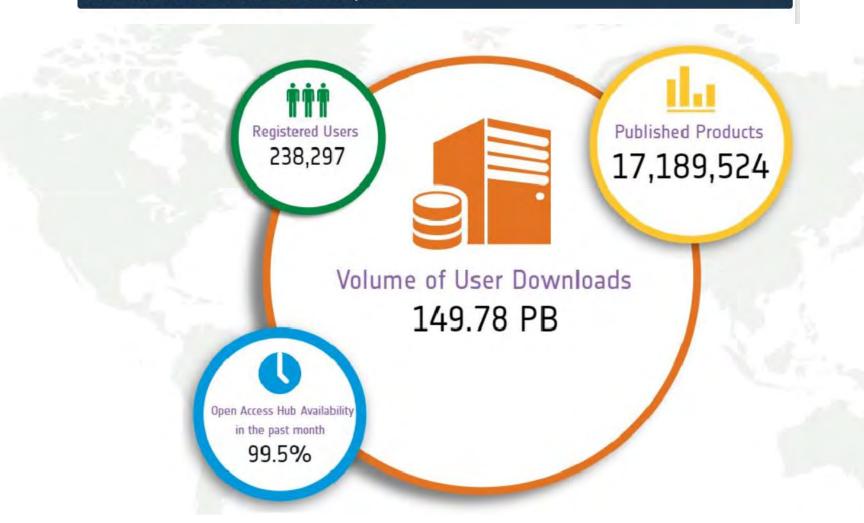
Available products, users and downloads (02/2021)

Statistics of all Data Hub Services since start of operations

Registered Users
238,297

Published Products
17,189,524

Volume of User Downloads
149.78 PB

Open Access Hub Availability
in the past month
99.5%

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Copernicus Open Access Hub: Sentinels

- User self-registration
- Geographical search
- Catalogue query
- Product Browse
- Download

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Copernicus Open Access Hub: Sentinels

- User self-registration
- Geographical search
- Catalogue query
- Product Browse
- Download

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Copernicus (Sentinel) Open Access Hub (1/5)

S1/S2/S3 and S5P data are available to all users via Sentinel data hub(s)…

user guide

We will focus on the Open hub!

"Access points" description (red circled) …Click on "Open HUB"

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Copernicus Open Access Hub overview and registration (2/5)

1) If you are already registered log in to start using the Sentinel Hub geographic interface to browse and download Sentinel data, if you are a new user click on the circled red link "SIGN UP" to complete registration

2) fill this form to start registration procedure (username and e-mail address should be provided in lower case only) then you will receive a mail with a link to validate your mail address. Finally an administrator will be able to let you access to the Sentinel Data Hub.

Please note that by registering in this website you are deemed to have accepted the T&C for Sentinel data use.(https://sentinel.esa.int/documents/247904/690755/Sentinel_Data_Terms_and_Conditions)

Copernicus Open Access Data Hub (3/5)

Once completed registration you can log in and use the "Advanced search" criteria , start use Sentinel hub interface to search and download sentinels data .

Search criteria available:

- **Draw region of interest**
- **Full text search**
- **Advanced search (prod, type,acqu.dates..)**

Sentinels Scientific Data Hub

The Sentinels Scientific Data Hub is a web based system designed to provide EO data users with distributed mirror archives and bulk dissemination capabilities for the Sentinels products.

Terms of Sentinels Scientific Data Hub portal and Data supply conditions

Full details on Sentinels at:
https://sentinel.esa.int/

Copernicus Open Access Hub (4/5)

Sentinels data are distributed using a SENTINEL-specific variation of the Standard Archive Format for Europe (SAFE) format

Select product of you interest and use the icons to (the circled red icons) :Zoom in the map, view product details * , move it in the 'Cart', "Download product"

Click and download, shopping cart, batch download. A maximum of 2 concurrent downloads per user is allowed in order to ensure a download capacity for all users.

Copernicus Open Access Hub (5/5)

* View product details is an online inspection of the searched products by browsing and pre-viewing the product metadata and measurements without downloading it. A preview panel displays information on the product contents and structure.

API Hub : access point for API users with no graphical interface

APIs And Batch Scripting. The Data Hub exposes two dedicated Application Program Interfaces (API) for browsing and accessing the EO data stored in the rolling archive. The APIs are:

Open Data Protocol (OData)
Open Search (Solr)

The OData interface is a data access protocol built on core protocols like HTTP and commonly accepted methodologies like REST that can be handled by a large set of client tools as simple as common web browsers, download-managers or computer programs such as **cURL** or **Wget** .

OpenSearch is a set of technologies that allow publishing of search results in a standard and accessible format. OpenSearch is RESTful technology and complementary to the OData. In fact, OpenSearch can be used to complementary serve as the query aspect of OData, which provides a way to access identified or located results and download them.

Sentinel-3 Pre-operational Hub : pre-operational access point for all users to Sentinel-3 data. Login credentials are s3guest:s3guest .

API Hub : access point for API users with no graphical interface. All API users regularly downloading the atest data are encouraged to use this access point for a better performance.

Copernicus data access User support

User Support

The Services Coordinated Interface (SCI) team can be contacted via email at EOSupport@Copernicus.esa.int for support, in particular for:

- Clarifications regarding the registration process
- Sentinel enquiries
- Reporting issues related to products/service quality

Following registration, the user can immediately download Sentinel products generated systematically from all acquired data. Please note that depending on the mission and the acquisition time of the product, the full operational qualification may not yet be completed.

Member States requiring data for national initiatives in the frame of the Sentinels Collaborative Ground Segment. Copernicus Services members and European Institutions, as well as Collaborative Ground Segments need not register on this service, they are served via dedicated access points.
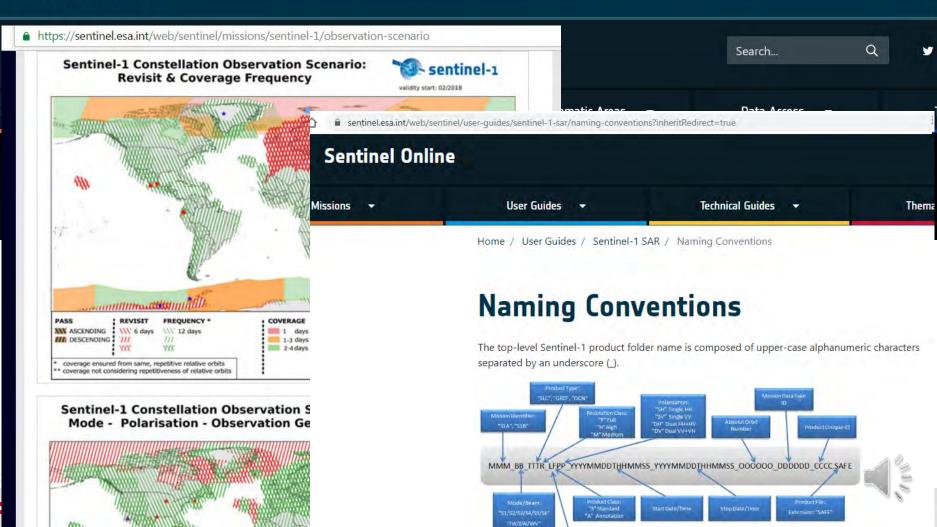
SENTINEL ONLINE WEBSITE

- **Sentinel online website:** technical guidelines for all sentinels, news and events related ,data access info and policy,last scientific resulst and more… https://sentinel.esa.int/web/sentinel/home

EUMETSAT Copernicus Online Data Access (CODA) (1/5)
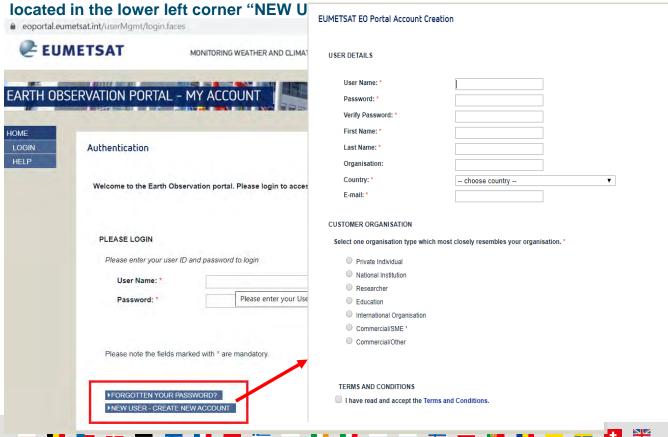
The Sentinel-3 Marine Products are available through the EUMETSAT Copernicus Online Data Access (CODA) service. CODA is an online rolling archive with https access to Sentinel-3 Level 1 and Level 2 (Marine) global data in different latency modes: Near Real-Time (NRT) – within 3 hours after sensing / 1 month archive ,Short time critical (STC) – only for SRAL instrument , Non time critical (NTC) within one month / 1 year archive

HOW TO ACCESS CODA
Open an internet browser (preferably Chrome or Firefox) and go to https://coda.eumetsat.int . Click 'OK' to be redirected to the EO Portal login screen below and If you do not have an account, create an account using the button located in the lower left corner "NEW U

fill this form to start registration procedure (username and e-mail address should be provided in lower case only) then you will receive a mail with a link to validate your mail address. Finally an administrator will be able to let you access to the CODA Hub.Please note that by registering in this website you are deemed to have accepted the T&C for Sentinel data use.(https://sentinels.copernicus.eu/documents/247904/690755/Sentinel_Data_Legal_Notice)
Once the registration procedure is over and the account created, log-in.
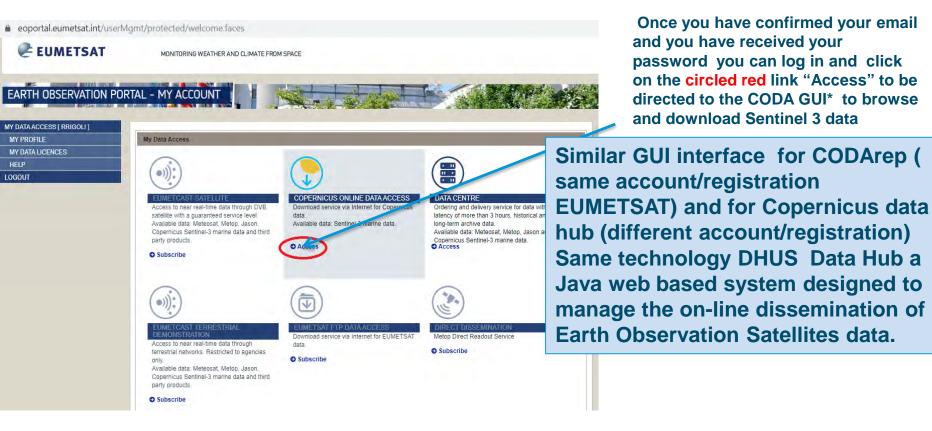
HOW TO ACCESS CODAREP Online Rolling Archive
Sentinel-3 data on CODA are always processed using the last available algorithms, but algorithms are periodically updated. So, in order to allow users to be able to access consistent datasets, "older" OLCI and SRAL NTC data have been reprocessed according to the latest standards. These reprocessed datasets are available with the same CODA account via the online archive at this link:
https://codarep.eumetsat.int

Once you have confirmed your email and you have received your password you can log in and click on the **circled red** link "Access" to be directed to the CODA GUI* to browse and download Sentinel 3 data

Similar GUI interface for CODArep (same account/registration EUMETSAT) and for Copernicus data hub (different account/registration) Same technology DHUS Data Hub a Java web based system designed to manage the on-line dissemination of Earth Observation Satellites data.

For more details see the manual available at https://coda.eumetsat.int/manual/CODA-user-manual.pdf

EUMETSAT CODA (3/5)

EUMETSAT CODA (4/5)
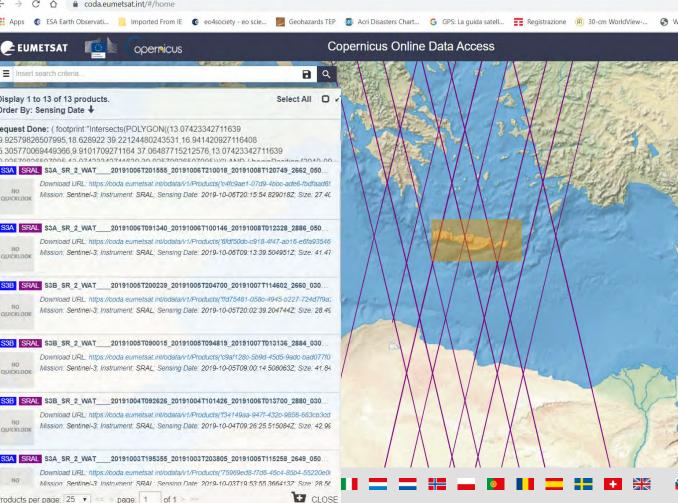
Data ingested on CODA and CODArep can be browsed using the Search Panel providing two different functionality :
- *Full text search* (using also wildcards and operators)
- *Advanced Search* (applying different filters like sensing time instrument ecc…)

Advanced search query example:
-Draw your AOI polygon by holding the left mouse button
-Open the search menu by clicking at the left of the search bar (≡)
-Select your search criteria (Product type ,Sensing time ecc..) and then press the search button (🔍)
-Search results will be displayed on the map* and listed in the tab (≡)

*In our example we have selected altimetry data (SRAL) so what are visualized on the map are tracks of the satellite that intersect the study area . Generally footprint of available products are showed on the map

Wildcards and Operators (e.g. OR, NOT,AND,*,?) are used to restrict search queries. Wildcards, in particular, are useful when performing a query on the *product filename*. Operators when combining different search criteria. It is also possible to perform full-text queries using search keywords. The syntax format to enter in
the Full text search bar is the following:
<keyword>:<values>

EUMETSAT CODA (5/5)
API Hub: access point for API users with no graphical interface

APIs And Batch Scripting. CODA and CODArep Web Services allows two dedicated Application Program Interfaces (API) for browsing and accessing the EO data stored in the rolling archive. The APIs are: :
Open Data Protocol (OData)
Open Search (Solr)
The OData interface is a data access protocol built on core protocols like HTTP and commonly accepted methodologies like REST that can be handled by a large set of client tools as simple as common web browsers, download-managers or computer programs such as **cURL** or **Wget** .
OpenSearch is a set of technologies that allow publishing of search results in a standard and accessible format. OpenSearch is RESTful technology and complementary to the OData. In fact, OpenSearch can be used to complementary serve as the query aspect of OData, which provides a way to access identified or located results

Full details and query examples in the CODA user Manual available at:

https://coda.eumetsat.int/manual/CODA-user-manual.pdf

dhusget script * → *you can download from https://coda.eumetsat.int/manual/dhusget.sh*
dhusget.sh is a simple demo script illustrating how to use OData and OpenSearch APIs to query
and download the products from any CODA and CODArep Web Services. It allows:
☐ Search products over a pre-defined AOI
☐ Filter the products by ingestion time, sensing time and coordinates
☐ Filter the products by 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

* In the current DHuS version, there is a known anomaly in the generation of the .meta4 file.
Only 100 products of the cart are inserted in the file, even if the cart contains more.

ACCESS TO SENTINEL DATA VIA CLOUD

In addition to the download services, the Sentinel Data Products are available in the Copernicus Data and Information Access Service (DIAS) cloud environments. Each DIAS provides processing resources, tools and complimentary data sources at commercial conditions to further facilitate the access to Sentinel data.

Initiative Name	Provider	Website, Target User Group, Rolling Size
Copernicus Open Access Hub	ESA	• URL: scihub.copernicus.eu • All • No rolling
Collaborative Data Hub	ESA	• URL: colhub.copernicus.eu • Authorized mirror sites • 30 days
Copernicus Services Hub	ESA	• URL: cophub.copernicus.eu • Copernicus Services • No rolling
International Hub	ESA	• URL: inthub.copernicus.eu • Copernicus International Agreements • 30 days
Copernicus Online Data Access	EUMETSAT	• URL: coda.eumetsat.int • All • 12 months

Initiative Name	Website	Initiative Name	Website
Australia National Mirror	copernicus.gov.au	Italy National Mirror	collaborative.mt.asi.it/#/home
Austria National Mirror	data.sentinel.zamg.ac.at/#/home	Portugal National Mirror	ipsentinel.ipma.pt/dhus/#/home
Finland National Mirror	finhub.nsdc.fmi.fi/#/home	Norway National Mirror	collaborative.mt.asi.it/#/home
France National Mirror	peps.cnes.fr/rocket/#/home	UK National Mirror	sedas.satapps.org
Germany National Mirror	code-de.org	Sweden National Mirror	swea.rymdstyrelsen.se/portal
Greece National Mirror	sentinels.space.noa.gr		

http://copernicus.eu/sites/default/files/Data_Access/Data_Access_PDF/Factsheet_Data_Access_National_Private_Initiatives.pdf

European Space Agency

OTHER DATA ACCESS PUBLIC INITIATIVE

Initiative Name	Provider	Website and Target User Group
CloudEO	CloudEO	• URL: cloudeo-ag.com • Users, developers and providers of geo data/ geo services; software developers
Geopedia platform	Synergise	• URL: geopedia.world • Users of geo data/ geo services
Geostorm platform	CS-SI	• URL: geostorm.eu • Users and developers of geo data/ geo services
Google Earth Engine	Google	• URL: earthengine.google.com • Scientists, researchers and developers
Planet platform	Planet	• URL: planet.com/products/platform/ • Users and developers of geo data/ geo services
Sentinel on AWS	Amazon	• URL: sentinel-pds.s3-website.eu-central-1.amazonaws.com • Developers, private/public downstream players
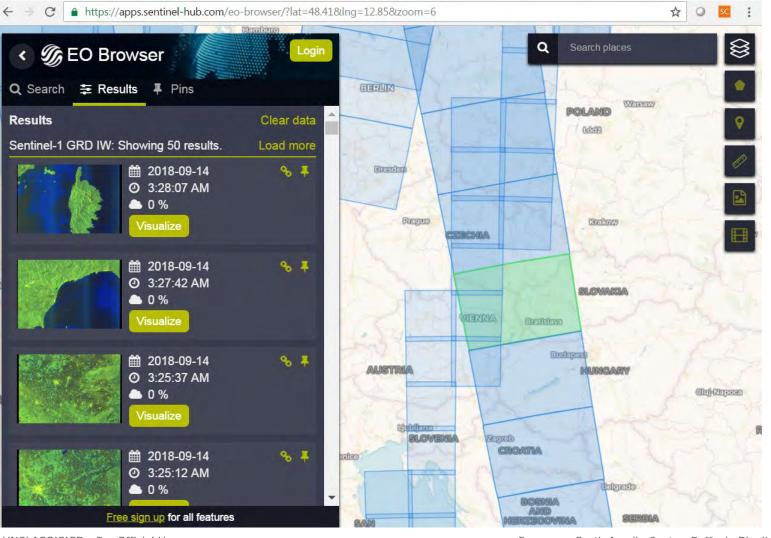
SENTINEL DATA HUB (EO BROWSER)

https://apps.sentinel-hub.com/eo-browser/

European Space Agency

NoR – ESA Network of Resources

eo4society.esa.int/sponsorship/

≡   🔍   📅

Sponsorship

NoR Sponsorship

The increasing size of available satellite mission data sets, together with Information Computer Technology (ICT) advances has resulted in a paradigm shift. Data do not need any more to be downloaded by the user to their local machine for further processing, on the contrary it is the user who can find the data and process them in cloud environments hosted by ICT providers with expandable processing capabilities. The Network of Resources (NoR) is an ESA initiative to facilitate the use of cloud environments by users, building on and enlarging the previous OSEO (Open Science for Earth Observation) call.

The NoR call aims to support research, development and pre-commercial users to innovate their working practices, moving from a data download paradigm towards a 'bring the user to the data' paradigm, considered essential for maintaining competitiveness of European data exploitation. The NoR Portal provides an ever increasing portfolio of innovative operational platform and cloud services operated by actors from participating countries[1]. Usage of these resources shall accelerate the achievement of scientific goals and the sharing of the results, or to approach the digital information market quicker and in an easier sustainable way.

The NoR will provide successful applicants with a voucher for the selected services, allowing free-at-point-of-use consumption for research, product development and up to pre-commercial demonstration. Vouchers must not be used to support any commercial revenue flows, for which the same services can be ordered on the NoR on a commercial basis, outside ESA support.

Available resources

Two types of resources are available on the NoR portal for which NoR has sponsorship agreements in place:

- an **EO Resource Tier Layer** which consists of cloud infrastructures with collocated data and provides the 'back-end' functionality where users can host their tools, algorithms and services.

- a front-end **Platform Services Layer** composed of the platform capabilities which provide enhanced functionality to the users and ease the access and use of EO datasets or provide support services.

Please create a shopping cart as part of a proposal submission. Please contact the help desk if any support is needed.

RUS - Research and User Support

- a service offering support, guidance and tools to help users get the best out of Copernicus Sentinel data

- **Open to you:** freely available for first-time data users to specialist users such as researchers, scientists, trainers, decision-makers, public authorities and general public

- **Expertise:** support team with strong experience in Earth observation applications and Sentinel sensors to help users tap into and exploit Sentinel data resources

European Space Agency

RUS – Research and User Support (2/3)

- **Hardware Configuration for Virtual Machine (VM)**
  - From 4 to 8 processing cores offered for limited period (~1 month) with 15-30 GB of RAM
  - Disk space from 100GB to 500GB

- **EO Data availability**
  - Sentinel-1/2/3 (via DataHub)
  - CCM (for authorised users)

- **Processing environment**
  - Sentinel-1/2/3 Toolboxes
  - Other tools: Orfeo Toolbox, QGIS, Sen2Cor, Sen2Three, SMOS Toolbox, NEST, BRAT Toolbox
  - GDAL library, NCO, NETCDF, OpenJPG, Image Magick, Rugged library

- **Development environment**
  - Eclipse, GCC, Cmake, Maven, Git, R,
  - Eclipse Mars plugins

RUS – Research and User Support (3/3)

- Virtual Platform **open and available** to public users (since 25/09/2017)

  - RUS Virtual platform: >2500 users (university and research ~55%)

  - RUS Webinars and F2F: >4000 participants

- **Communication:** ~5000 followers on **Twitter**

  - http://rus.copernicus.eu

  - https://twitter.com/RUS_Copernicus

  - https://www.youtube.com/channel/UCB01WjameYMvL7-XfI8vRIA/videos

@RUS_Copernicus

RUS video service presentation:
https://www.youtube.com/watch?v=OEAhrDdG9Lc

SNAP Toolbox & STEP forum

SNAP is free available for download at http://step.esa.int/main/download/ the current version 6.0 will be mainly used in the practical session of this course and is already installed on your RUS VM

PolSARpro v6.0 (Biomass Edition) Toolbox

step.esa.int/main/download/polsarpro-v6-0-biomass-edition-toolbox-download/

→ Science Toolbox Exploitation Platform

PolSARp ... **wnload**

PolSARp...

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To be informe...
functionality.

The PolSARpro v6.0 (Biomass Edition) Software offers the possibility to handle and convert polarimetric data from a range of well established polarimetric spaceborne missions like ALOS-1 / PALSAR-1, ALOS-2 / PALSAR-2, COSMO-SKYMED, GaoFen-3, RADARSAT-2, RISAT, TerraSAR X, Tandem-X, SENTINEL-1A & B. In order to prepare for the forthcoming polarimetric spaceborne missions, the PolSARpro v6.0 (Biomass Edition) Software is expanded to support the following additional data sources: ALOS-4 / PALSAR-3, BIOMASS, SAOCOM, NISAR, NOVASAR-S, RCM / RADARSAT-3, TerraSAR-L etc …

Download:
http://step.esa.int/main/download/polsarpro-v6-0-biomass-edition-toolbox-download/

General presentation:
http://step.esa.int/docs/extra/PolSARpro_v6_General_Presentation.pdf

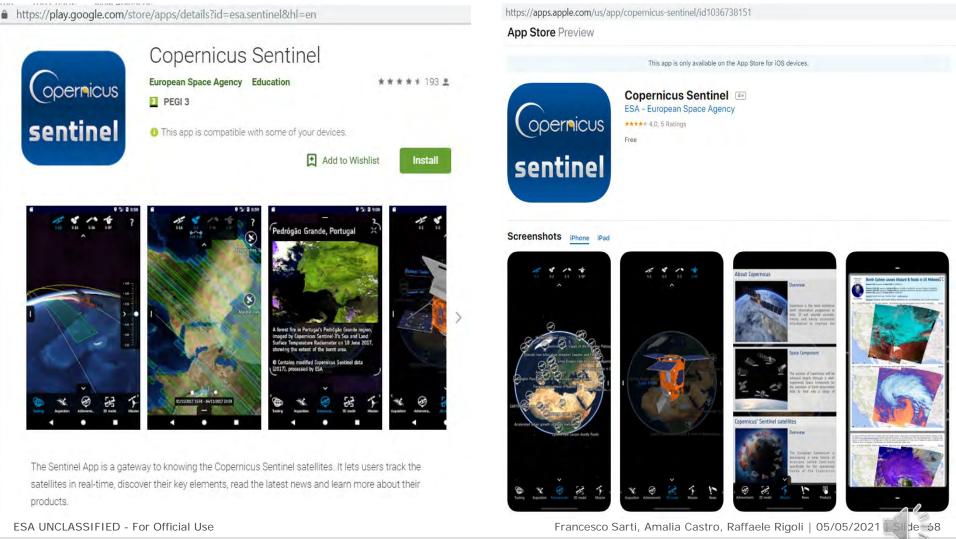Menu window and run the "check"

The Sentinel ESA APP

Developed by ESA and the European Commission, the Copernicus Sentinel App is a free App for iOS and Android mobile devices. It allows users to track the Sentinel satellites in orbit and see when and where they send their data back to Earth, either directly or by laser to the European Data Relay System.

Thank you!

If you have any doubts or questions on a specific ESA or ESA TPM on how to obtain the data contact ESA

eopi@esa.int
eohelp@esa.int

European Space Agency