



Federal Ministry  
for Economic Affairs  
and Climate Action

# An Update on the Ground Segments of the Hyperspectral DESIS and EnMAP Missions

2nd Workshop of the *Collaboration Across Research Fields* in Remote Sensing,  
16.-17.10.2024, Karlsruhe

M. Bachmann, E. Carmona, F. Feckler, M. Habermeyer, U. Heiden, S. Holzwarth, D. Marshall, M. Pato, R. De los Reyes, M. Schneider, M. Tegler, H. Zwenzner and many others from the DESIS & EnMAP Ground Segments, DLR Earth Observation Center (EOC)

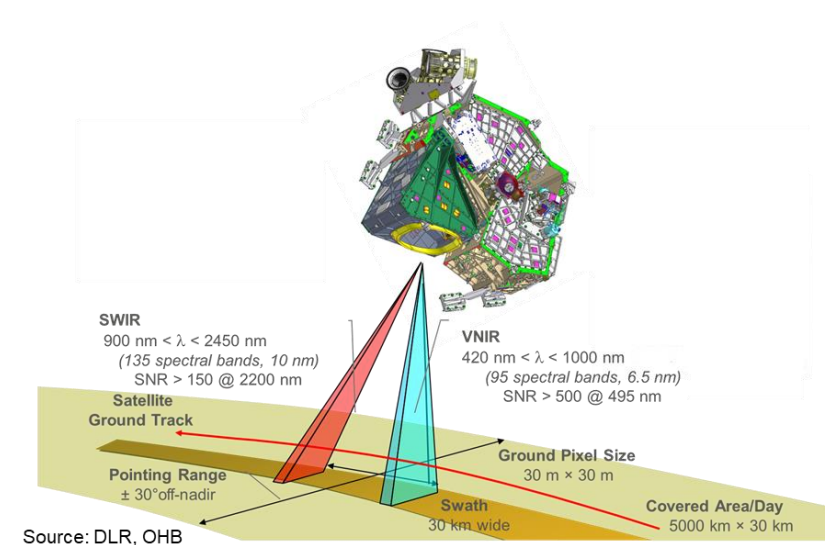
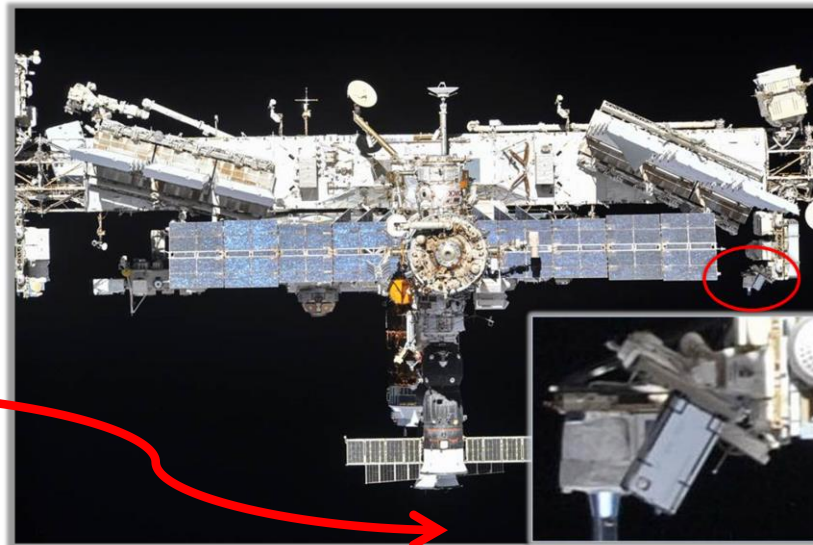
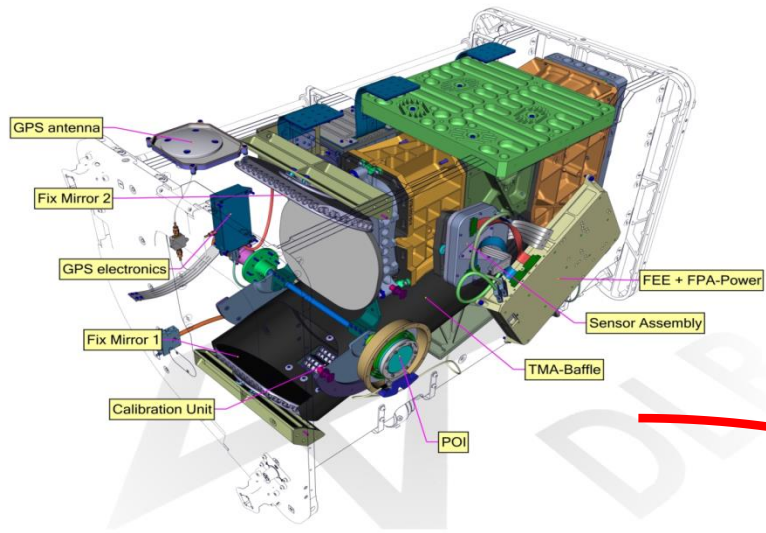
S. Chabrillat, M. Brell, R. Milewski, K. Segl and many other from GFZ Science Segment

V. Krieger, L. La Porta, U. Knodt and many other from DLR Space Agency

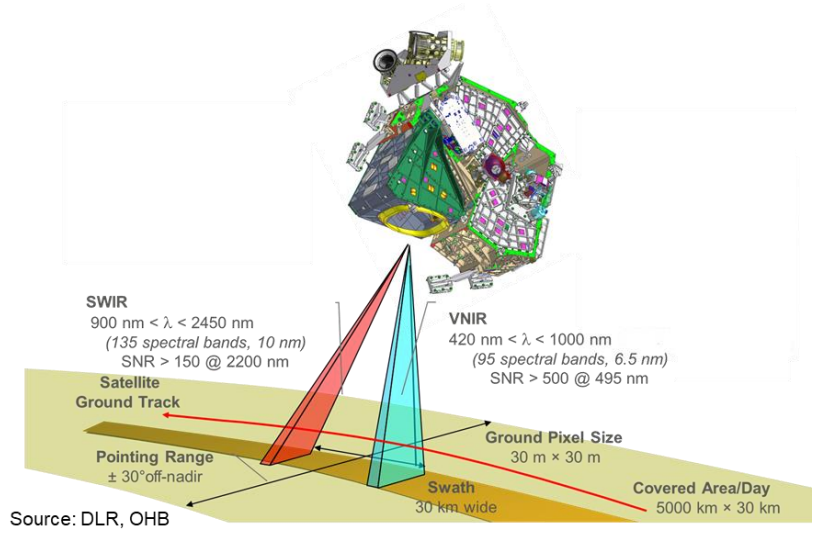
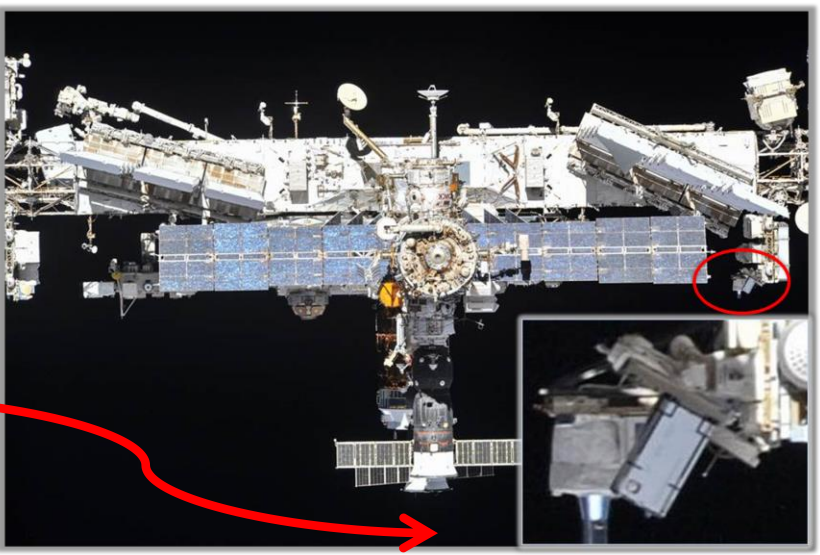
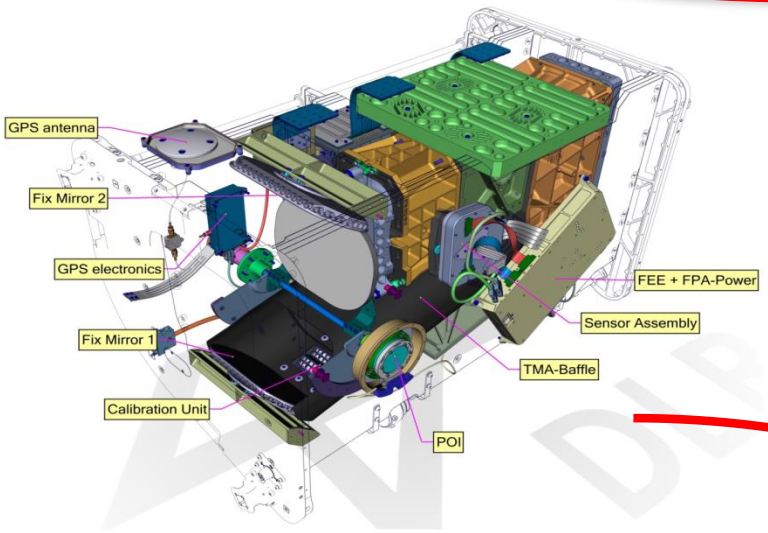
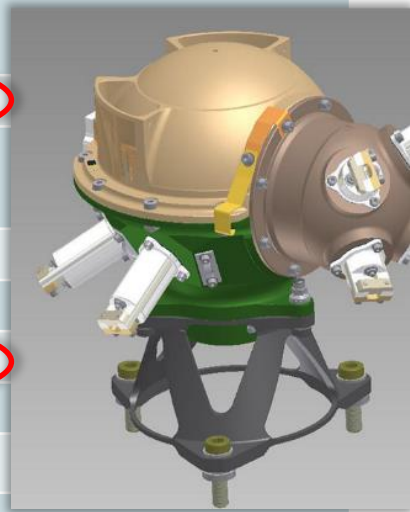
B. Murphy and H. Lester from Teledyne Brown Engineering



| Mission Instrument::                             | ISS/MUSES DESIS  | EnMAP HSI (2 instruments)                        |
|--|--|--|
| Off-nadir tilting<br>(across-track, along-track) | -45° (backboard) to +5° (starboard), -40° to +40° (by MUSES and DESIS) | -30° to +30°,<br>0° (by EnMAP)                   |
| Spectral range                                   | 400 nm to 1000 nm  | 420 nm to 2450 nm                                |
| Spectral (res., acc.)                            | 2.55 nm, (*)   | 6.5 nm, 0.5 nm (VNIR),<br>10.0 nm, 1.0 nm (SWIR) |
| Radiometry (res., acc.)                          | 13 bits, (*)   | 14 bits, 5%                                      |
| Spatial (res., swath)                            | 30 m, 30 km (@ 400 km)   | 30 m, 30 km                                      |
| SNR (signal-to-noise)                            | 205 (no bin.)/406 (4 bin.) @ 550 nm                                    | 500 @ 495 nm, 150 @ 2200 nm                      |
| Instrument (mass)                                | 93 kg  | 350 kg   |
| Capacity (km, storage)                           | 2360 km per day, 225 GBit  | 5000 km per day, 512 GBit                        |
| In orbit since                                   | 2018   | 2022   |



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| Capacity (km, storage)                        | 2360 km per day, 225 GBit  | 5000 km per day, 512 GBit                     |
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| Mission Instrument::                          | ISS/MUSES DESIS  | EnMAP HSI (2 instruments)                     |
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| SNR (signal-to-noise ratio)                   | 500 @ 495 nm, 150 @ 2200 nm  | 500 @ 495 nm, 150 @ 2200 nm                   |
| Instrument mass                               | 350 kg   | 350 kg  |
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| In orbit since                                | 2018   | 2022  |

## DESIS Mission Status

### Background:

- Teledyne (TBE) responsible for commercial & US users
- DLR responsible for scientific exploitation of the mission

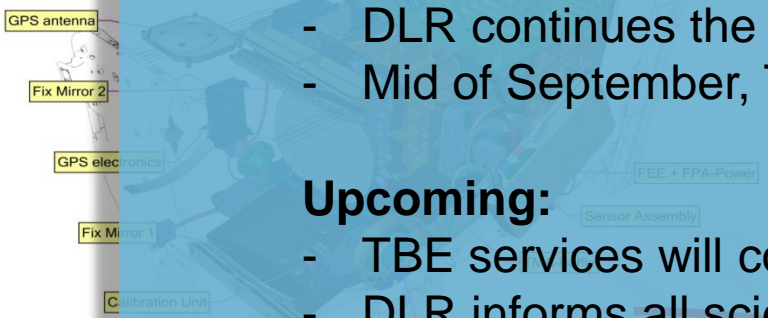
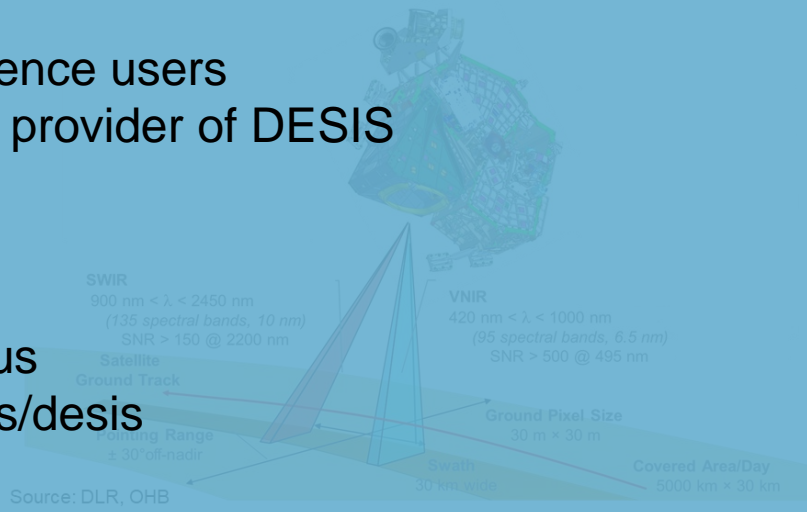
### Current Mission Status:

- End of May 2024, TBE stopped archive and acquisition services of the DESIS mission (including the data transfer to DLR)
- DLR continues the archiving and processing services for science users
- Mid of September, TBE has been selected by NASA as data provider of DESIS


### Upcoming:

- TBE services will continue – schedule still unclear.
- DLR informs all scientific users about the change of the status

<https://www.dlr.de/en/eoc/research-transfer/projects-missions/desis>




# EnMAP – Online Ressources



Home Data & Access Mission Science & Applications Tools Events & Education

## Mission




EnMAP provides unique data needed to address major environmental challenges related to human activities and climate change. The mission's main objective is to provide high-quality, regional scale hyperspectral data to improve our understanding of coupled environmental processes and to assist in the sustainable management of Earth's resources. Despite being a primarily scientific mission, EnMAP has clear potential to evolve into an operational service.

### Mission Outline

- Dedicated pushbroom hyperspectral imager mainly based on modified existing or pre-developed technology
- Broad spectral range from 420 nm to 1000 nm (VNIR) and from 900 nm to 2450 nm (SWIR) with high radiometric resolution and stability in both spectral ranges
- 30 km swath width at a spatial resolution of 30 x 30 m, nadir revisit time of 27 days and off-nadir (30°) pointing feature for fast target revisit (4 days)
- Sufficient on-board memory to acquire 1,000 km swath length per orbit and a total of 5,000 km per day.

### Status

The EnMAP mission is currently in its operational phase. Full readiness of the ground segment for in-orbit operations is ensured and utilization for in-orbit spacecraft operations has been authorized; all mission components are verified and validated.



Commissioning Phase  
Launch and Early Orbit Phase  
Decommissioning Phase

Organization  
Space Segment  
Ground Segment  
Mission Exploitation Program

RELATED DOCUMENTS

- EnMAP Specifications
- Glossary of Abbreviations
- Glossary of Terms
- EnMAP Spectral Bands

GROUND TRACKS

- EnMAP Ground Tracks 2024
- EnMAP Ground Tracks 2023
- EnMAP Ground Tracks 2022

QUARTERLY REPORTS

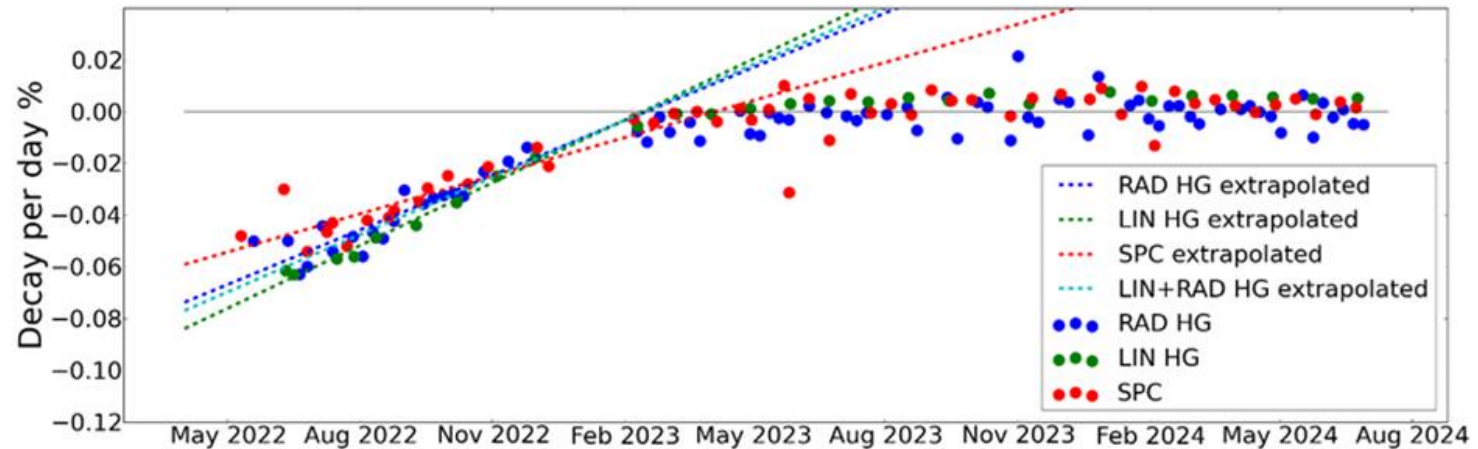
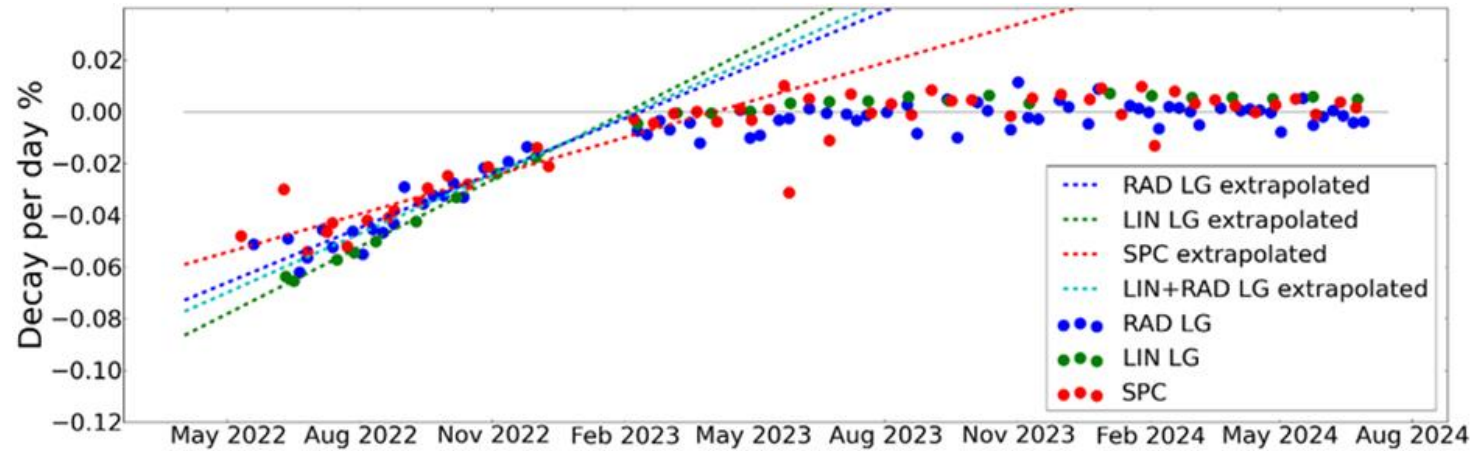
- 07 (01.01.2024-31.03.2024)
- 06 (01.10.2023-31.12.2023)

# EnMAP – Online Ressources



The screenshot shows the EnMAP website's 'Mission' page. At the top is a banner image of the satellite in orbit over Earth. Below the banner is a navigation menu with tabs for Home, Data & Access, Mission, Science & Applications, Tools, and Events & Education. On the left side, there is a sidebar menu with categories: Organization, Space Segment, Ground Segment, Mission Exploitation Program, and RELATED DOCUMENTS (including EnMAP Specifications, Glossary of Abbreviations, Glossary of Terms, and EnMAP Spectral Bands). The main content area is titled 'Mission' and contains text about the mission's goals to address environmental climate change using regional scale hyperspectral sensors. A large blue callout box with white text is overlaid on the page, stating: 'Information on CAL / VAL / QC is provided within the quarterly reports'. An arrow points from this box to the 'QUARTERLY REPORTS' section at the bottom of the page, which lists reports for 07 (01.01.2024-31.03.2024) and 06 (01.10.2023-31.12.2023). A timeline diagram at the bottom shows the mission phases: Launch and Early Orbit Phase, Commissioning Phase, and Decommissioning Phase.

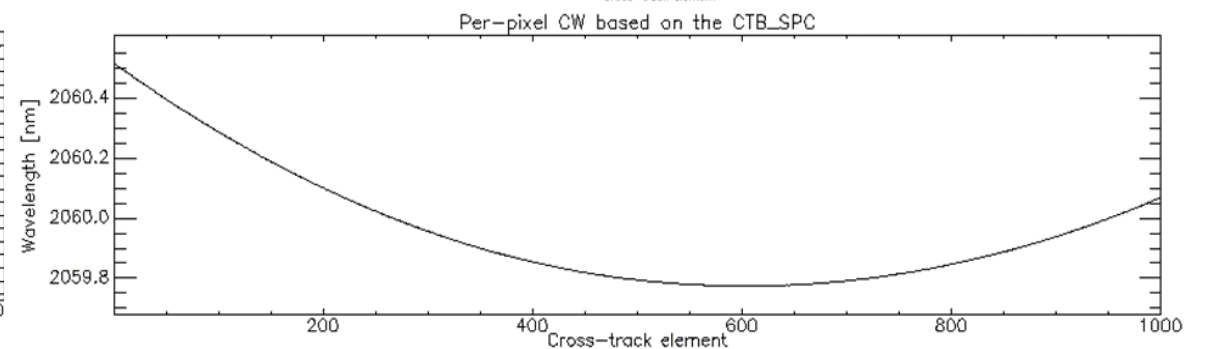
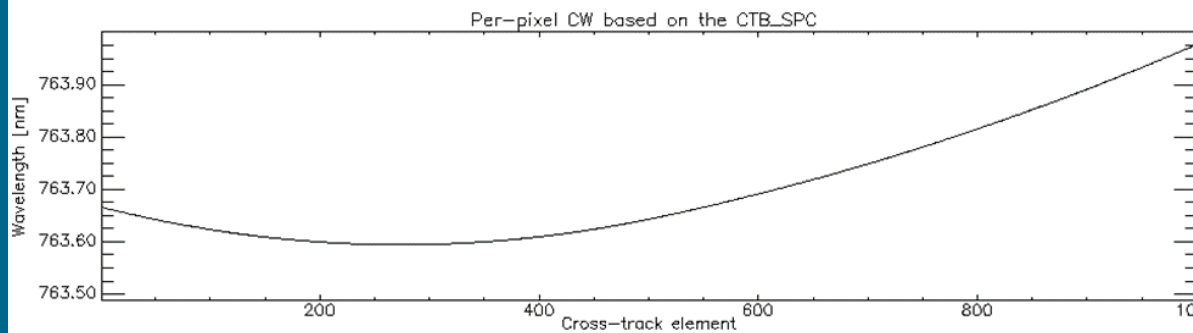
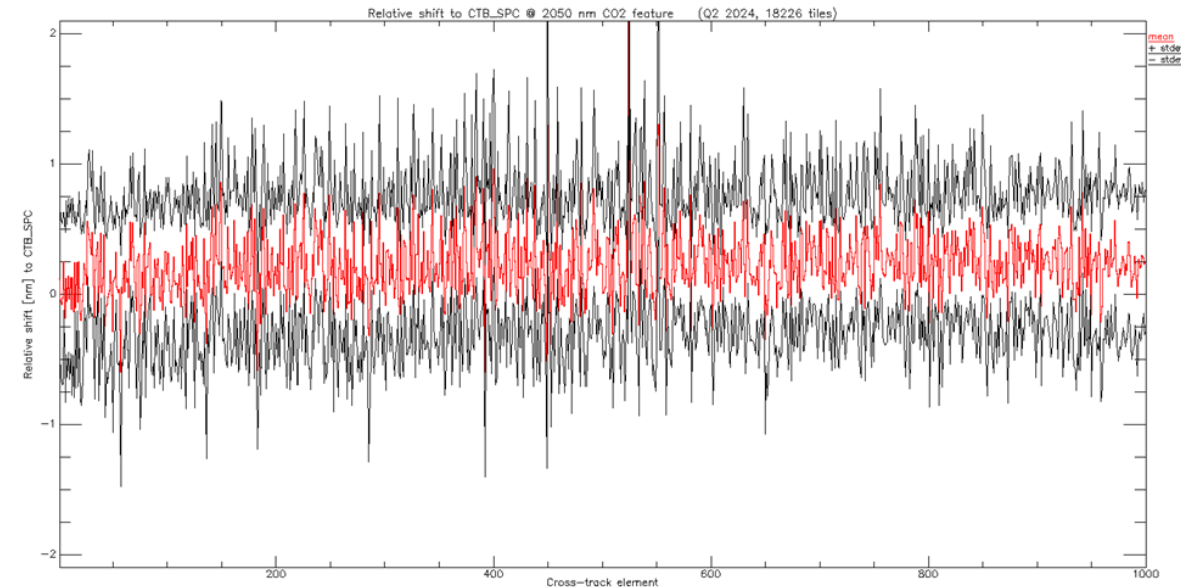
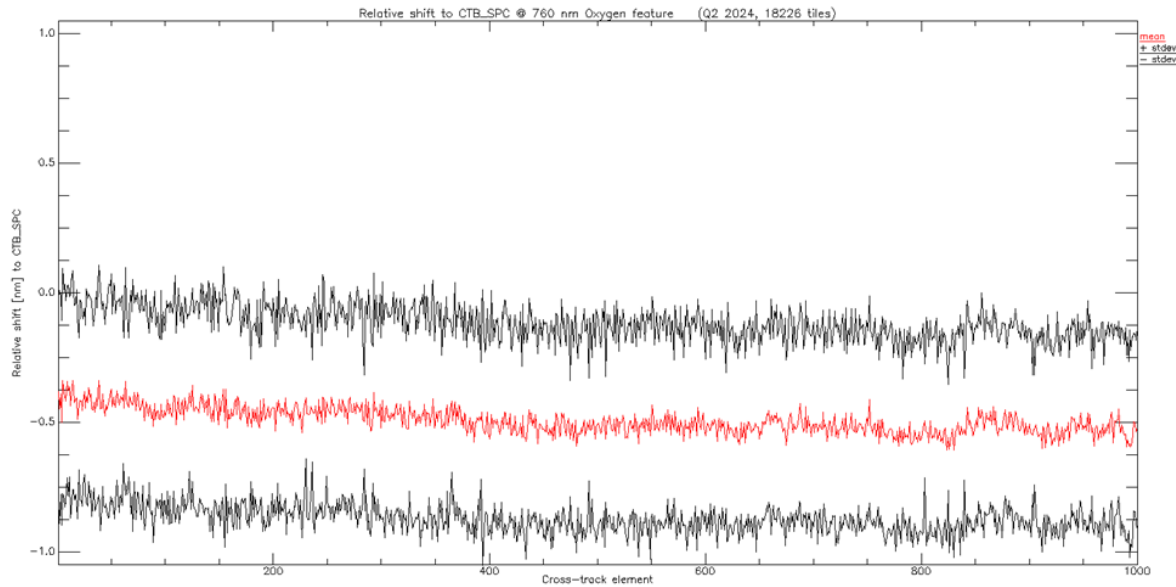
# Radiometric Performance



VNIR Decay per day from Lamp (RAD), Linearity (LIN) and Spectral (SPC) measurements for low gain (top) and high gain (bottom)

Note: SWIR stable since CP

# Spectral Performance – Vicarious estimate



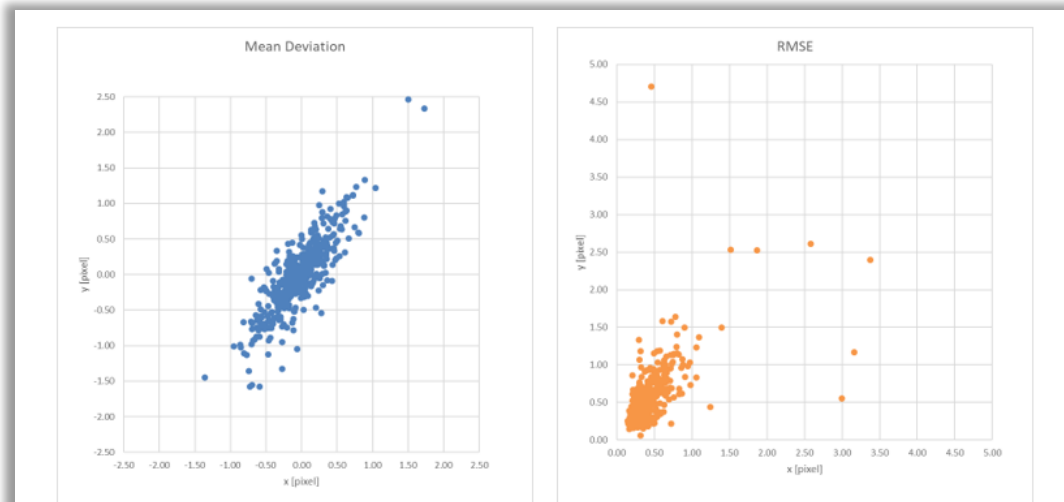
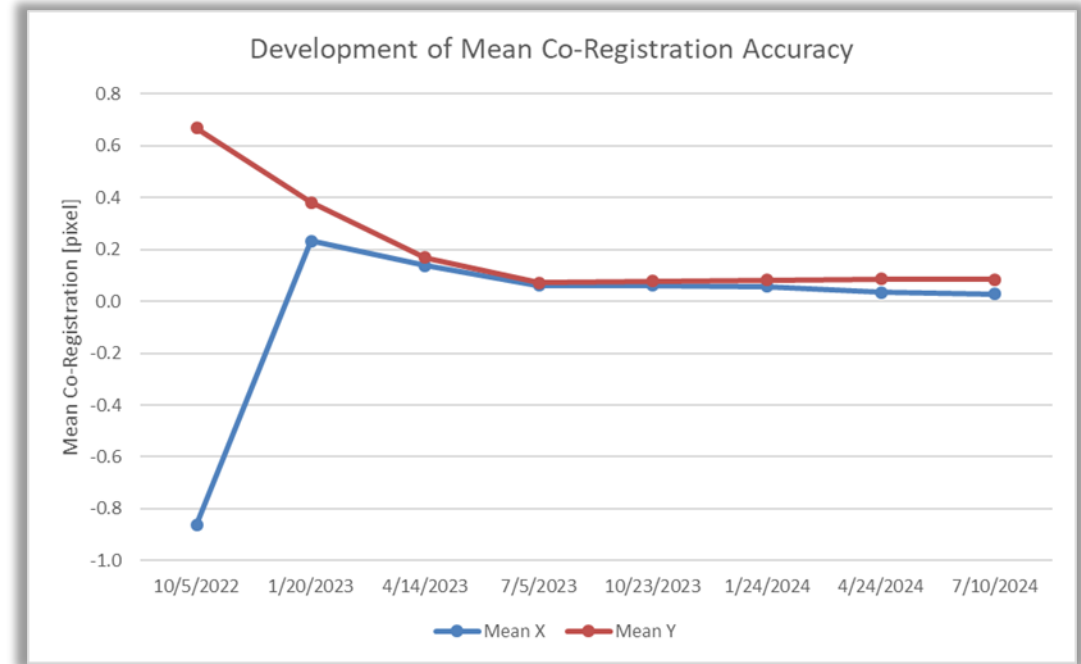
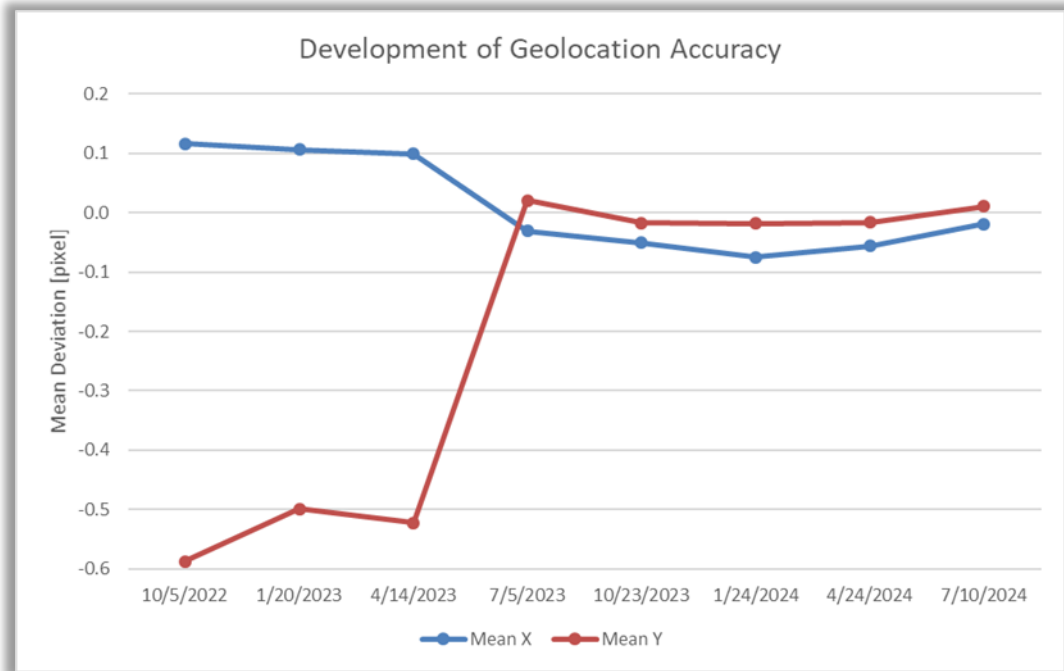
760 nm Oxygen feature, 18.226 tiles (Q2, 2024)  
Shift w.r.t. nominal CTB\_SPC

2050 nm CO2 feature, 18.226 tiles (Q2, 2024)  
Shift w.r.t. nominal CTB\_SPC

Spectral bandwidth (FWHM, Gaussian): 8.9 nm (760 nm) and 8.7 nm (2050 nm)



# Geometric Performance



Reference:  
Image-to-image matching in L1C (LoS refinement)  
to global cloud-free S2 reference mosaic (by DLR)

Figure 7-24 Mean deviation of EnMAP L1C products in pixel (left). RMSE value for EnMAP L1C products in pixel (right)

# EnMAP – Online Ressources



The screenshot shows the EnMAP website interface. At the top is a banner image of the satellite in orbit over Earth. Below the banner is a navigation menu with tabs: Home, Data & Access, Mission, Science & Applications, Tools, and Events & Education. The 'Mission' tab is selected. On the left is a sidebar with categories: Organization, Space Segment, Ground Segment, Mission Exploitation Program, and RELATED DOCUMENTS (listing EnMAP Specifications, Glossary of Abbreviations, Glossary of Terms, and EnMAP Spectral Bands). The main content area is titled 'Mission' and contains text about the mission's goals to address environmental climate change using regional scale hyperspectral sensors. A large blue callout box with white text is overlaid on the page, stating: 'Information on CAL / VAL / QC is provided within the quarterly reports'. An arrow points from this box to the 'QUARTERLY REPORTS' section at the bottom of the page, which lists reports for 07 (01.01.2024-31.03.2024) and 06 (01.10.2023-31.12.2023). A timeline diagram at the bottom shows the 'Launch and Early Orbit Phase', 'Commissioning Phase', and 'Decommissioning Phase'.

# EnMAP – Online Ressources



Information on CAL / VAL / QC is provided within the quarterly reports

Processor Change Log  
FAQs

ATBDs

EnMAP processor change log

| EnMAP processor version  | Date       | Description  |
|--------------------------|------------|--|
| 01.00.01                 | 08.04.2022 | First processor version at launch.   |
| 01.01.00                 | 11.07.2022 | <ul style="list-style-type: none"> <li>Fixed matching for datatakes covering multiple UTM zones.</li> <li>Fixed processing of scenes in antimeridian.</li> <li>Fixed border effect due to adjacency correction in L2A land products.</li> <li>Fixed bands filled with NaN in some L2A products.</li> </ul>   |
| 01.01.01                 | 10.08.2022 | <ul style="list-style-type: none"> <li>Removed L2A quality rating from L0 overall quality rating.</li> </ul>   |
| 01.01.09                 | 30.09.2022 | <ul style="list-style-type: none"> <li>Activated dehaze functionality in L2A processing.</li> </ul>  |
| 01.01.11                 | 24.11.2022 | <ul style="list-style-type: none"> <li>Fixed units of L2A water products.</li> </ul>   |
| <a href="#">01.02.00</a> | 28.03.2023 | <ul style="list-style-type: none"> <li>Improved co-registration accuracy.</li> <li>Implemented interpolation of VNIR radiometric and RNU coefficients to reduce effect of VNIR degradation.</li> <li>Implemented cross-track destriping of L1B products.</li> <li>Adapted spectral regions for interpolation in L2A processing.</li> <li>Flag scenes with sun elevation angle of 0° or below (i.e., night scenes) as low quality.</li> </ul> |
| 01.03.00                 | 25.07.2023 | <ul style="list-style-type: none"> <li>Fixed errors in DEM over Azerbaijan and Armenia.</li> </ul>   |
| 01.03.03                 | 25.07.2023 | <ul style="list-style-type: none"> <li>Fixed errors from MODIS to Copernicus for ozone and land surface temperature values used in L2A.</li> <li>Fixed very high reflectances for snow in L2A.</li> </ul>  |
| <a href="#">01.04.00</a> | 25.07.2023 | <ul style="list-style-type: none"> <li>Re-activated adjacency correction over water in L2A products (unintentionally de-activated in v01.01.11).</li> </ul>  |
| 01.04.01                 | 10.01.2024 | <ul style="list-style-type: none"> <li>Fixed peaks in snow spectra at 590 nm and 647 nm in L2A products.</li> </ul>  |
| <a href="#">01.04.02</a> | 15.03.2024 | <ul style="list-style-type: none"> <li>Fixed spectral noise in water spectra below 500 nm in L2A products.</li> </ul>  |

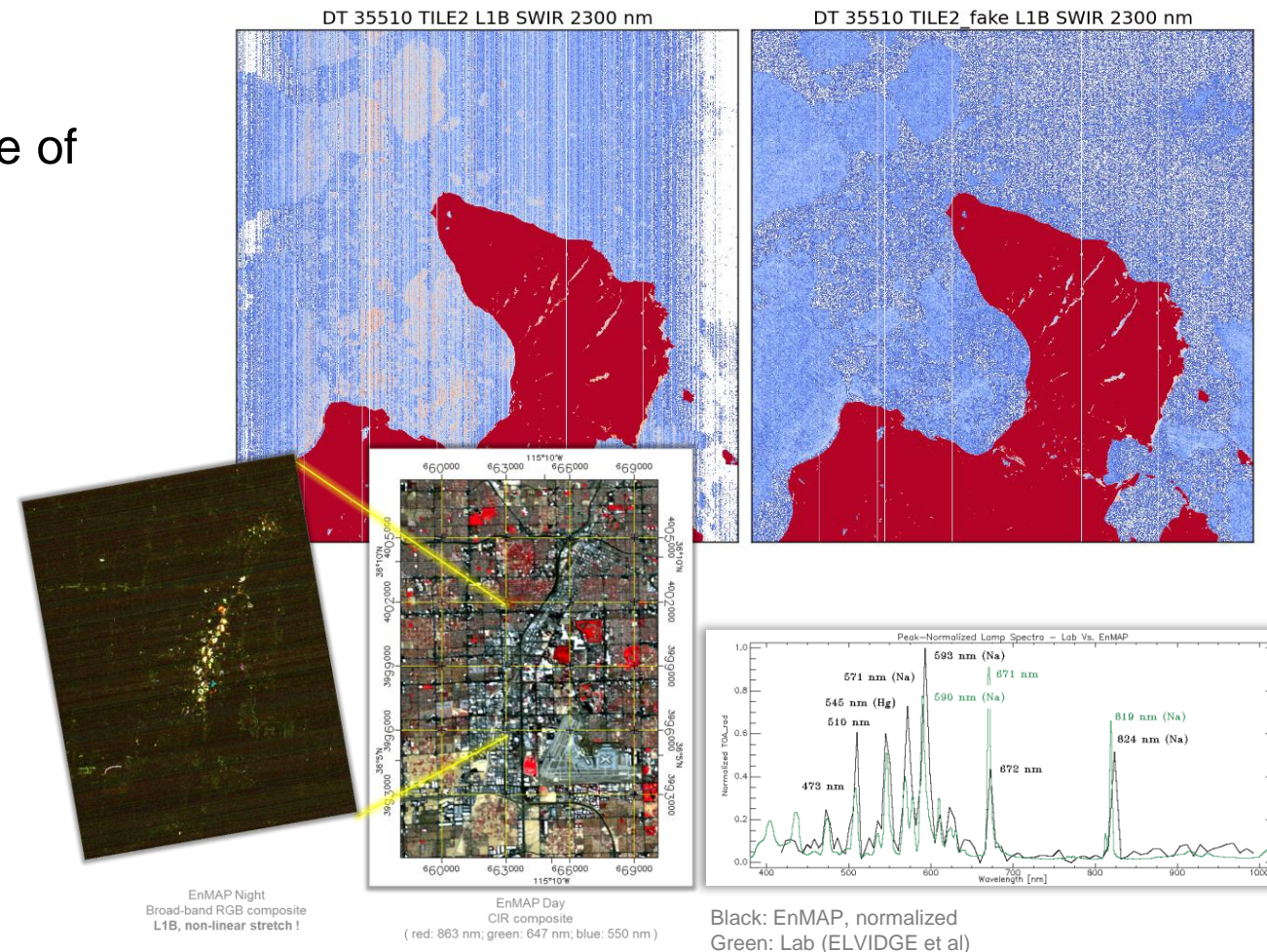
Upcoming:

- Additional metadata entries for view angles
- L2A adjacency correction improvements
- Improved DC correction for low-light scenes

# EnMAP – Updates on Processing

## ■ Improved DC correction for SWIR (mixed gain mode)

- Issue: for low-light & night scenes slight pattern is visible  
Note: this radiance range is anyway outside of the instrument specifications !
- Improved correction developed and validation in progress
- Relative change to old baseline is small:
  - Change in low gain range always <1%
  - For nominal scenes, change in high gain range of ~2%
  - For night & low-rad scenes, local changes of 5% up to 10%



# L2A @ eoc geoservice



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## Datasets

All Themes | Atmosphere | Hydrosphere | Anthroposphere | Topography | Satellite Imagery | Cryosphere | Biosphere | Natural Hazards

All Groups | EnMAP - Environmental Mapping and Analysis Program | TanDEM-X | Sentinel-2 | Sentinel-5P | World Settlement Footprint (WSF®) | Burnt Area

Global SnowPack (GSP) | Global WaterPack (GWP) | IceLines | Forest & Vegetation Products | Land Cover - Germany

MODIS - Moderate Resolution Imaging Spectroradiometer | MetOp GOME-2 Daily Total Column Composites | Shuttle Radar Topography Mission (SRTM)

Further Products

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## Datasets Anthroposphere

All Themes | **Anthroposphere**

All Groups | World Settlement Footprint (WSF®) | Further Products

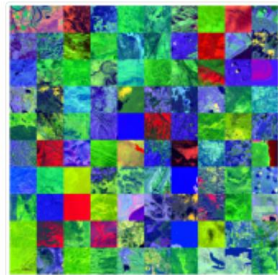
The Anthroposphere section of this data portal provides comprehensive information on the man-made environment, including urban structures, infrastructure development, energy infrastructure and human activities, to provide insights into the interactions between the built environment and socio-economic processes.

### World Settlement Footprint (WSF®)

The World Settlement Footprint Suite is a collection of novel global datasets designed to provide high-resolution and reliable information on the extent of settlement areas.

## EnMAP - Environmental Mapping and Analysis Program

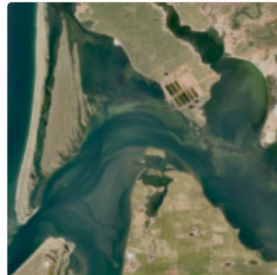
The Environmental Mapping and Analysis Program (EnMAP) is a German hyperspectral satellite mission that monitors and characterizes Earth's environment on a global scale. EnMAP delivers accurate data that provides information on the status and evolution of terrestrial and aquatic ecosystems, supporting environmental monitoring, management, and decision-making.



EnMAP HSI - SpectralEarth - non-georeferenced - Global  
2022-08-15



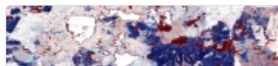
EnMAP HSI - Level 0 Quicklooks - Global  
2022-10-10



EnMAP HSI - Level 2A Hyperspectral Images - Global  
2022-10-10

## TanDEM-X

The objective of the TanDEM-X mission (TerraSAR-X add-on for Digital Elevation Measurement) is to produce a highly accurate, three-dimensional image of our Earth with uniform quality and unprecedented accuracy.



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Home / Datasets / Global SnowPack (GSP)

## Global SnowPack (GSP)

Global SnowPack is a global service which maps snow cover extent at different temporal scales.

All Themes | Cryosphere

All Groups | Global SnowPack (GSP)

### Global SnowPack (GSP) - Mean

This product shows the mean snow cover duration (SCDmean), which is updated each year and consists of the arithmetic mean for

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## Datasets Atmosphere

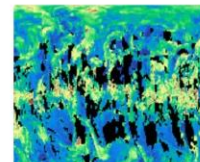
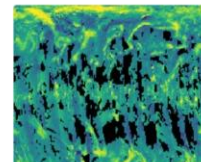
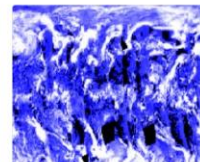
All Themes | **Atmosphere**

All Groups | Sentinel-5P | MetOp GOME-2 Daily Total Column Composites

The Atmosphere section of this data portal provides comprehensive information on atmospheric conditions, including temperature, air pressure, humidity, wind speed and direction, and other meteorological parameters to provide detailed insights into weather and climate patterns and quality analyses.

### Sentinel-5P

Sentinel-5 is an Earth observation mission from the EU's Copernicus Programme.



# L2A @ eoc geoservice




Home / Collections / ENMAP HSI L2A / items / ENMAP01-\_\_\_L2A-DT000006551\_20221212T015854Z\_003\_V010400\_20231123T092657Z (html)

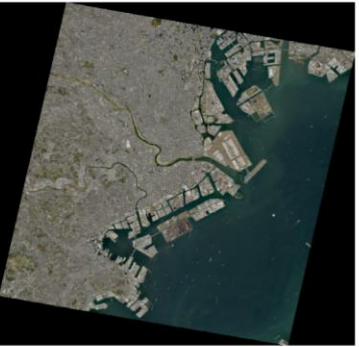
## ENMAP01-\_\_\_L2A-DT000006551\_20221212T015854Z\_003\_V010400\_20231123T092657Z

Parent [html](#) [json](#) Collection [html](#) [json](#) Item [html](#) [json](#) OpenSearch [geojson](#) [atom/xml](#) [O&M](#)

**Collection:**  
**Platform:** ENMAP  
**Instrument:** HSI  
**Sensor Type:** OPTICAL

**Extents:**  
**Spatial:** 139.5202, 35.3692, 139.9265, 35.6887  
**Temporal:** 2022-12-12T01:58:54.846Z / 2022-12-12T01:58:59.38Z

**Map:**  
  
Footprint

**Preview:**  


**Properties:**  
**Parent Identifier:** ENMAP\_HSI\_L2A  
**Crs:** 32654  
**Created:** Nov 23, 2023, 6:32:50 PM  
**Updated:** Nov 23, 2023, 6:32:50 PM  
**Cloud Cover:** 1  
**Snow Cover:** 0  
**Processing Center:** NZ  
**Processing Level:** L2A  
**Relative Orbit Number:** 3750  
**[CARD4L] Eastern Geometric Accuracy:** 1  
**[CARD4L] Geometric Accuracy Radial Rmse:** 2  
**[CARD4L] Northern Geometric Accuracy:** 2  
**[CARD4L] Specification:** SR  
**[CARD4L] Specification Version:** 5.0  
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**[ENMAP] Acquisition Configuration:** earth  
**[ENMAP] Acquisition Type:** EARTH  
**[ENMAP] Across Off Nadir Angle:** 9.68043151163  
**[ENMAP] Along Off Nadir Angle:** 0.267556625689

**Assets:**

Metadata [metadata](#)

Spectral Image [data](#)

**Properties:** [Download](#)

**Key:** image  
**Title:** Spectral Image  
**Type:** image/tiff; application=geotiff; profile=cloud-optimized  
**Roles:** data  
**Description:** Earth image measurement data covering 1 tile (30x30km) in orthorectified geometry  
**Link:** [https://download.geoservice.dlr.de/ENMAP/files/L2A/2022/12/12/DT000006551/03/ENMAP01-\\_\\_\\_L2A-DT000006551\\_20221212T015854Z\\_003\\_V010400\\_20231123T092657Z-SPECTRAL\\_IMAGE\\_COG.TIF](https://download.geoservice.dlr.de/ENMAP/files/L2A/2022/12/12/DT000006551/03/ENMAP01-___L2A-DT000006551_20221212T015854Z_003_V010400_20231123T092657Z-SPECTRAL_IMAGE_COG.TIF)

**EO Bands:**  
1

https://nbviewer.org/github/dlr-eoc/ukis-data-tutorials/blob/main/enmap/enmap\_da... | TIMELINE | EnMAP | EnMAP\_QC\_valrepo... | EnMAP\_PMST | EnMAP\_Quaternion | RID\_Tool | EOC Portal | EOC IT-Info

## pyter

JUPYTER FAQ </>

to be drawn about the condition of and changes to the planet's surface.

The 'EnMAP L2A HSI Products'-collection provides all 224 bands as CEOS-ARD data using atmospheric correction over land. L2A Products provide a complete atmospheric correction of the orthorectified EnMAP L1C product. The L1C processor orthorectifies image tiles from the VNIR and SWIR instrument independently. After the orthorectification the two image tiles are co-registered (requirement better than 0.2-pixel size) and form a geometric consistent product over the whole wavelength range. The result of the atmosphere correction is reflectance (in % units) values and pixel classification (quality layers).

One Product consists of the following files:

- ENMAP.HSI.L2A-SPECTRAL\_IMAGE
- ENMAP.HSI.L2A-METADATA
- ENMAP.HSI.L2A-STAC\_JSON
- ENMAP.HSI.L2A-QL
  - QL\_VNIR
  - QL\_VNIR\_THUMBNAIL
  - QL\_SWIR
  - QL\_QUALITY\_CLASSES
  - QL\_QUALITY\_CLOUD
  - QL\_QUALITY\_CLOUDSHADOW
  - QL\_QUALITY\_HAZE
  - QL\_QUALITY\_CIRRUS
  - QL\_QUALITY\_SNOW
  - QL\_QUALITY\_TESTFLAGS
  - QL\_QUALITY\_PIXELMASK

This notebook provides informations on how to programmatically access this collection, which is using the UserManagementSystem [UMS] to authenticate users. To execute the script and the terminal commands, a valid user account is needed for the requested dataset.

## Download using the STAC-API and python

The first step is to connect to the EOC Geoservice STAC API and to query the EnMAP L2A HSI collection. In the first case we query data that have the boundingbox (bbox) of the DLR Oberpfaffenhofen and were acquired in the year 2023. 4 Items will be found. In the second query we have the same bbox and time but add a filter for "enmap:overallQuality" to gain only results with a "nominal quality".

```
In [8]: from pystac_client import Client

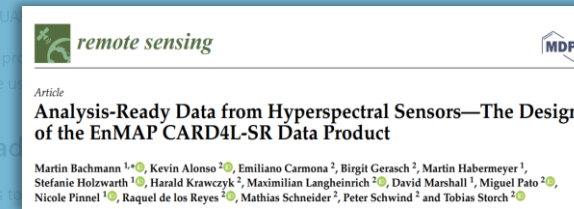
catalog = Client.open("https://geoservice.dlr.de/eoc/ogc/stac/v1/")
collections = ["ENMAP_HSI_L2A"]
bbox = [11.230259, 48.051808, 11.337891, 48.117059] #DLR Oberpfaffenhofen
dates = ["2023-01-01", "2023-12-31"]
parameters = "enmap:overallQuality=0"
```

# L2A @ eoc geoservice



https://nbviewer.org/github/dlr-eoc/ukis-data-tutorials/blob/main/enmap/enmap\_da...  
TIMELINE EnMAP EnMAP\_QC\_valrepo... EnMAP\_PMST EnMAP\_Quaternion RID\_Tool EOC Portal EOC IT-Info

- geoservice Status:
  - EnMAP: online
  - DESIS: currently in CEOS ARD review, test version running, expected start of production in Q4 2024
- Web services: WCS, WFS, WMS etc., bulk image download possible
- Data format: COG (Cloud-Optimized GeoTIFF)
- STAC Catalogue containing the metadata of the full EnMAP archive
- EnMAP reprocessing to L2A (standard processing) almost finished, all recent data readily available
- Data product is CEOS Analysis Ready Data (ARD)
- EOWEB on-demand processing using latest processor & cal. additionally maintained



ENMAP01-\_\_\_\_L2A-DT0000006551\_20221212T015854Z\_003\_V010400\_20231123T092657Z (hub)

Parent: [OpenSearch](#) | [geoservices](#) | [atom/xml](#) | [DRM](#)

Collection: [Map](#) [Preview](#)

Platform: ENMAP  
Instrument: SI  
Sensor Type: OPTICAL

Extents:  
Spatial: 139.5202, 35.3692, 139.9265, 35.6887  
Temporal: 2022-12-12T01:58:54.846Z / 2022-12-12T01:58:54.846Z

Properties:  
Parent Identifier: ENMAP\_HSI\_L2A  
Crs: 32654  
Created: 2023-11-23T09:26:57Z  
Updated: 2023-11-23T09:26:57Z  
Cloud Cover: 0  
Snow Cover: 0  
Processing Center: NZ  
Processing Level: L2A  
Relative Orbit Number: 3790  
[CARD4L] Backdoor Geometric Accuracy: 1  
[CARD4L] Backdoor Radiometric Accuracy: 1  
[CARD4L] Backdoor Radiometric Accuracy: 1  
[CARD4L] Specification: SR  
[CARD4L] Specification Version: 5.0  
[ENMAP] Swir Aorswirb Selected: SWIRA  
[ENMAP] Acquisition Configuration: earth  
[ENMAP] Acquisition Type: EARTH  
[ENMAP] Across Off Nadir Angle: 0.68043151163  
[ENMAP] Along Off Nadir Angle: 0.267556625689

Assets:  
Metadata [Download](#)

Properties:  
Key: image  
Title: Spectral Image  
Description: Earth image measurement data covering 1 tile (30x30km) in orthorectified geometry  
Link: [https://download.geoservice.dlr.de/ENMAP/files/L2A/20221212/DT0000006551/03/ENMAP01-\\_\\_\\_\\_L2A-DT0000006551\\_20221212T015854Z\\_003\\_V010400\\_20231123T092657Z-SPECTRAL\\_IMAGE\\_COG.TIF](https://download.geoservice.dlr.de/ENMAP/files/L2A/20221212/DT0000006551/03/ENMAP01-____L2A-DT0000006551_20221212T015854Z_003_V010400_20231123T092657Z-SPECTRAL_IMAGE_COG.TIF)  
EO Bands: [Download](#)

pyter

to be drawn about the condition of and changes to the planet's surface.

The 'EnMAP L2A HSI Products'-collection provides all 224 bands as CEOS-ARD data using atmospheric correction over land. L2A Products provide a complete atmospheric correction of the orthorectified EnMAP L1C product. The L1C processor orthorectifies image tiles from the VNIR and SWIR instrument independently. After the orthorectification the two image tiles are co-registered (requirement better than 0.2-pixel size) and form a geometric consistent product over the whole wavelength range. The result of the atmosphere correction is reflectance (in % units) values and pixel classification (quality bands).

One Product consists of the following files:

- ENMAP.HSI.L2A-SPECTRAL\_IMAGE
- ENMAP.HSI.L2A-METADATA
- ENMAP.HSI.L2A-STAC\_JSON

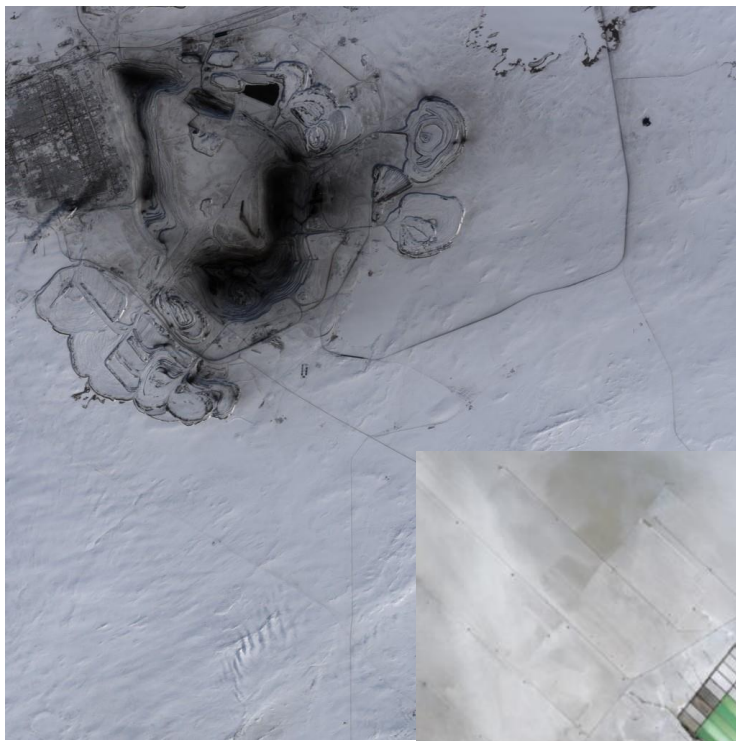
- QL\_VNIR\_THUMBNAIL
- QL\_SWIR
- QL\_QUALITY\_CLASSES
- QL\_QUALITY\_CLOUD
- QL\_QUALITY\_CLOUDSHADOW
- QL\_QUALITY\_HAZE
- QL\_QUALITY\_CLIFFS
- QL\_QUALITY\_TESTLAGS
- QL\_QUALITY\_TESTLAGS

This notebook provides a tutorial on how to use the EnMAP STAC client to authenticate with the geoservice and download data.

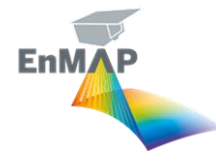
Download

```
In [8]: from pystac_client import Client

catalog = Client.open("https://geoservice.dlr.de/eoc/ogc/stac/v1/")
collections = ["ENMAP_HSI_L2A"]
bbox = [11.230259, 48.051808, 11.337891, 48.117059] #DLR Oberpfaffenhofen
dates = ["2023-01-01", "2023-12-31"]
parameters = {"enmap.overallQuality=0"}
```

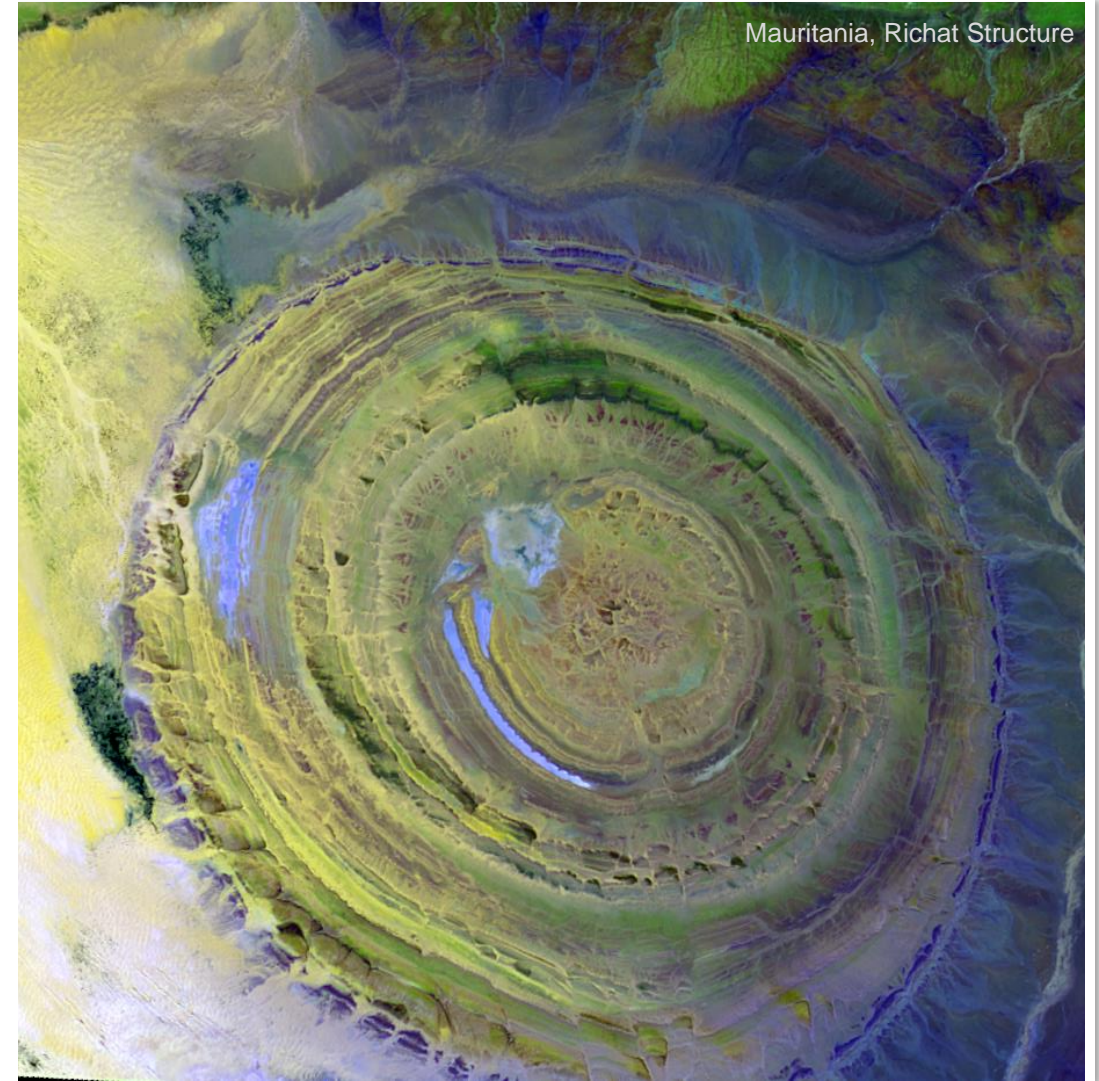


DEGIS



Salar de Uyuni; Bolivia

Coal mine South  
East of Ekibastus;  
Kazachstan

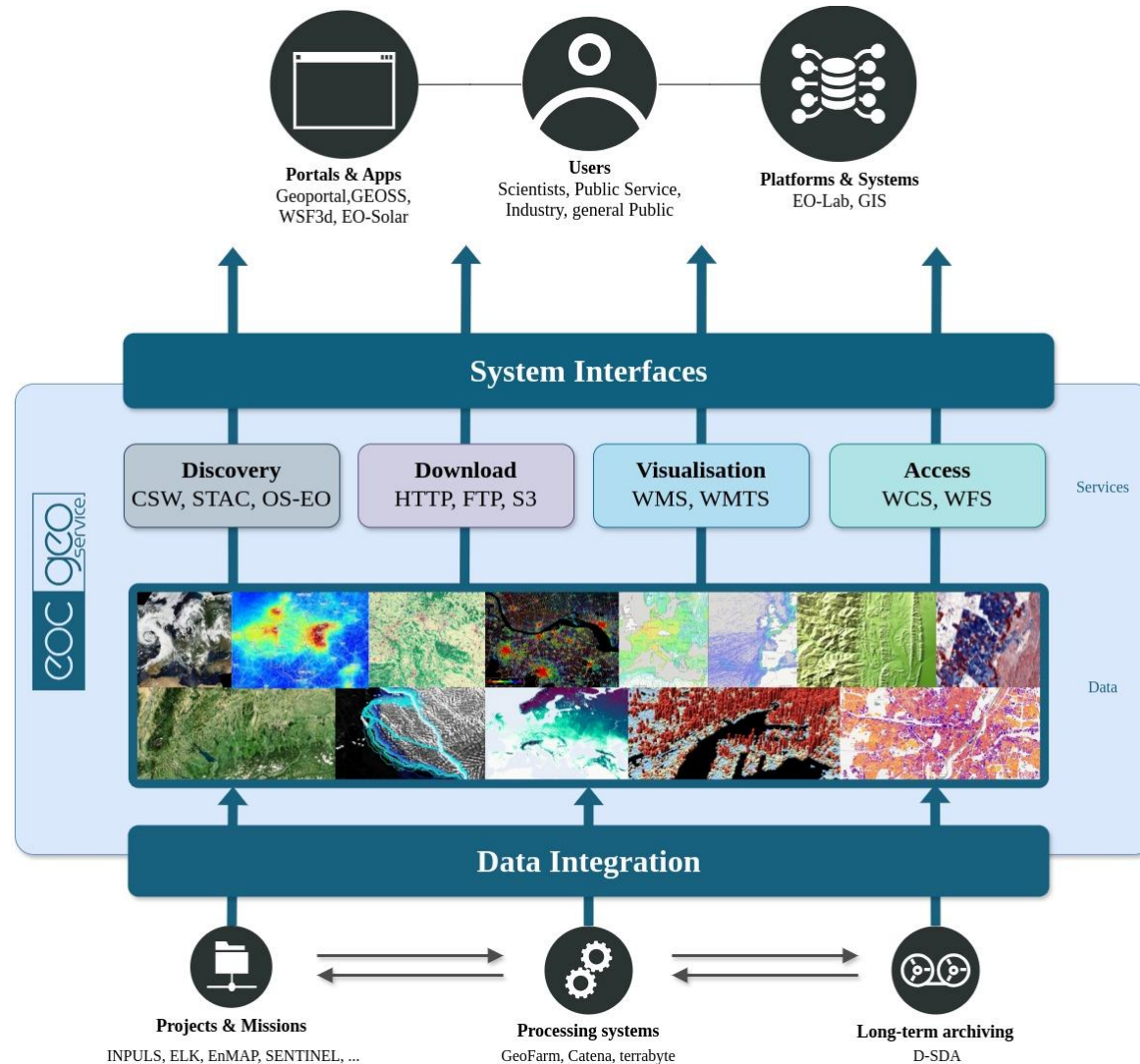


Mauritania, Richat Structure

**Thank you very much for  
your attention!**

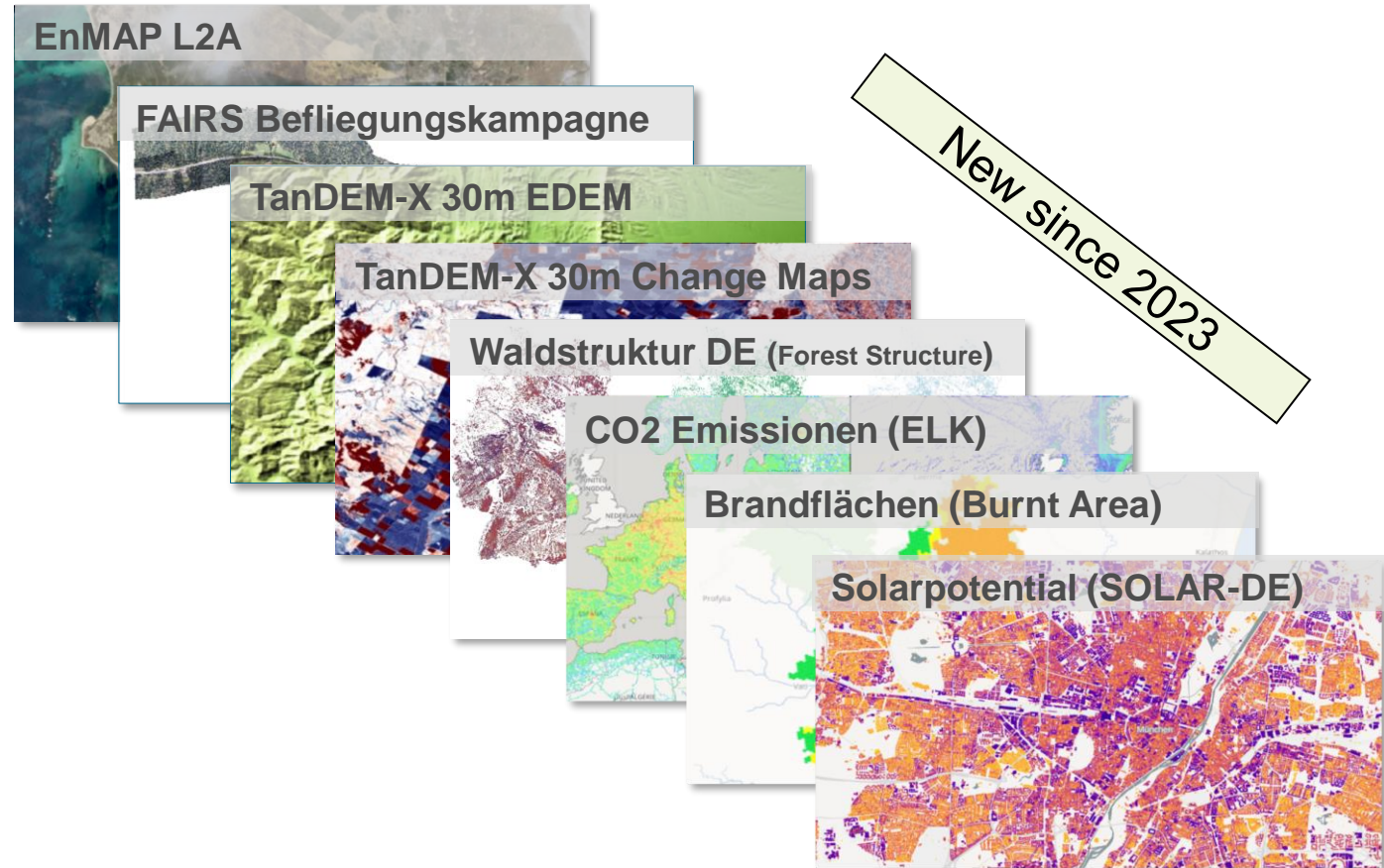
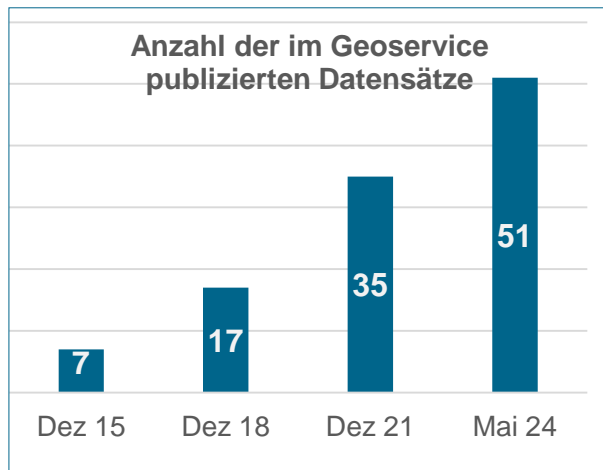
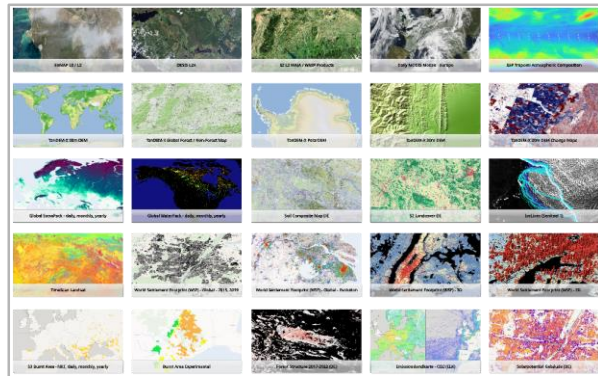


# EOC Geoservice



- Wide range of services and products in the field of earth observation and geoinformation
- Map services: Provision of topographic maps, thematic maps and other georeferenced information services.
- Geoweb services: APIs and web services for integrating earth observation data into your own applications.
- Open data policy for the scientific community through compliance with the FAIR principles

# EOC Geoservice – Data publication



EnMAP L2A

FAIRS Befliegungskampagne

TanDEM-X 30m EDEM

TanDEM-X 30m Change Maps

Waldstruktur DE (Forest Structure)

CO2 Emissionen (ELK)

Brandflächen (Burnt Area)

Solarpotential (SOLAR-DE)

New since 2023

- Wide range of earth observation data and derived geoinformation products
- Transfer of research results from missions and projects
- Data integration by EOC Geoservice team