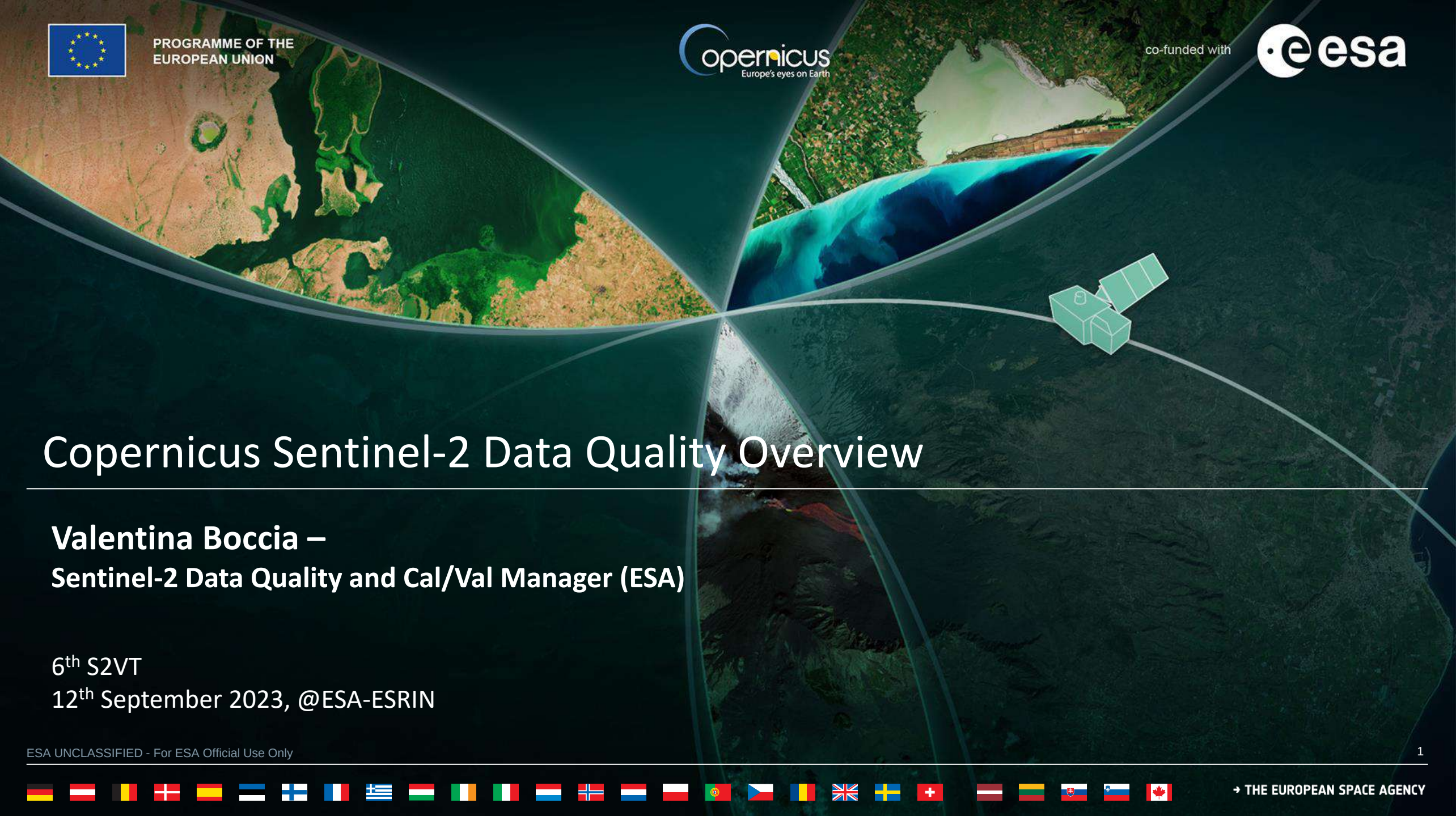


Copernicus Sentinel-2 Data Quality Overview

Valentina Boccia –
Sentinel-2 Data Quality and Cal/Val Manager (ESA)

6th S2VT
12th September 2023, @ESA-ESRIN

ESA UNCLASSIFIED - For ESA Official Use Only

Presentation Outline

- Copernicus Sentinel-2 Data Quality Framework
- Copernicus Sentinel-2 Data Quality Status
- Copernicus Sentinel-2 GRI
- Sentinel-2 Level-2H and Level-2F Pilot Products
- Sentinel-2 Work in Progress Activities (S2 L2A Acquatic Layer, DGGS, L1C and L2A RUT)
- Sentinel-2 Evolutions under evaluation
- Sentinel-2 Collection-1
- Parallel Cal/Val Activities (FRM4Veg and SRIX4Veg, Cal/Val Park)
- S2VT – Some Logistics

OPT-MPC

ACRI ST, France

with sub-contractors

adwäisEO, Luxemburg

Airbus DS, France

Albavalor, Spain

ARGANS

Brockmann Consult, Germany

CS Group, France

Deimos, Spain

DLR, Germany

FMI, Finland

Telespazio, France

VITO, Belgium

Spectral Earth, Germany

with associate partners

Since 4th October 2021 the S2 MPC has been replaced by the

OPT-MPC
Optical Mission Performance Cluster

sentinel-2

SENTINEL 3

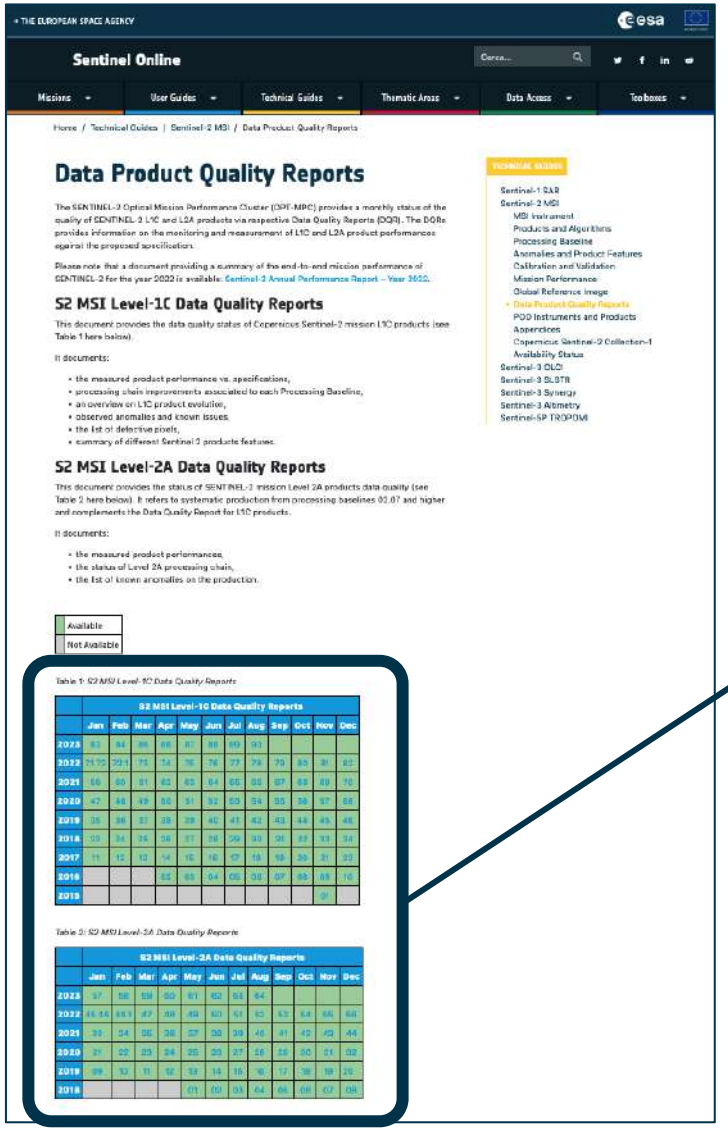
OPT-MPC

Since 4th October 2021 the S2 MPC has been replaced by the

OPT-MPC
Optical Mission Performance Cluster

sentinel-2

S2 Products Perfomance Reporting (1/2)



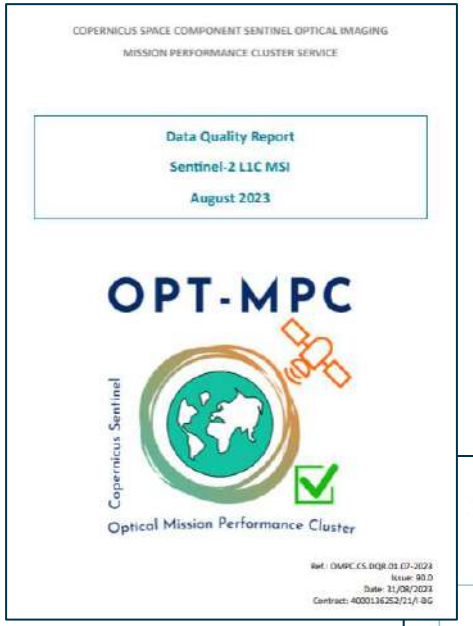
Available
Not Available

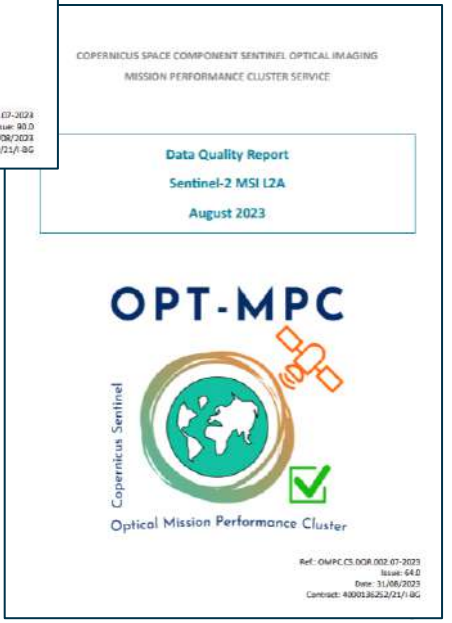
Table 1: S2 MSI Level-1C Data Quality Reports

	S2 MSI Level-1C Data Quality Reports											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2023	83	84	85	86	87	88	89					
2022	71 72	72.1	73	74	75	76	77	78	79	80	81	82
2021	59	60	61	62	63	64	65	66	67	68	69	70
2020	47	48	49	50	51	52	53	54	55	56	57	58
2019	35	36	37	38	39	40	41	42	43	44	45	46
2018	23	24	25	26	27	28	29	30	31	32	33	34
2017	11	12	13	14	15	16	17	18	19	20	21	22
2016				02	03	04	05	06	07	08	09	10
2015											01	

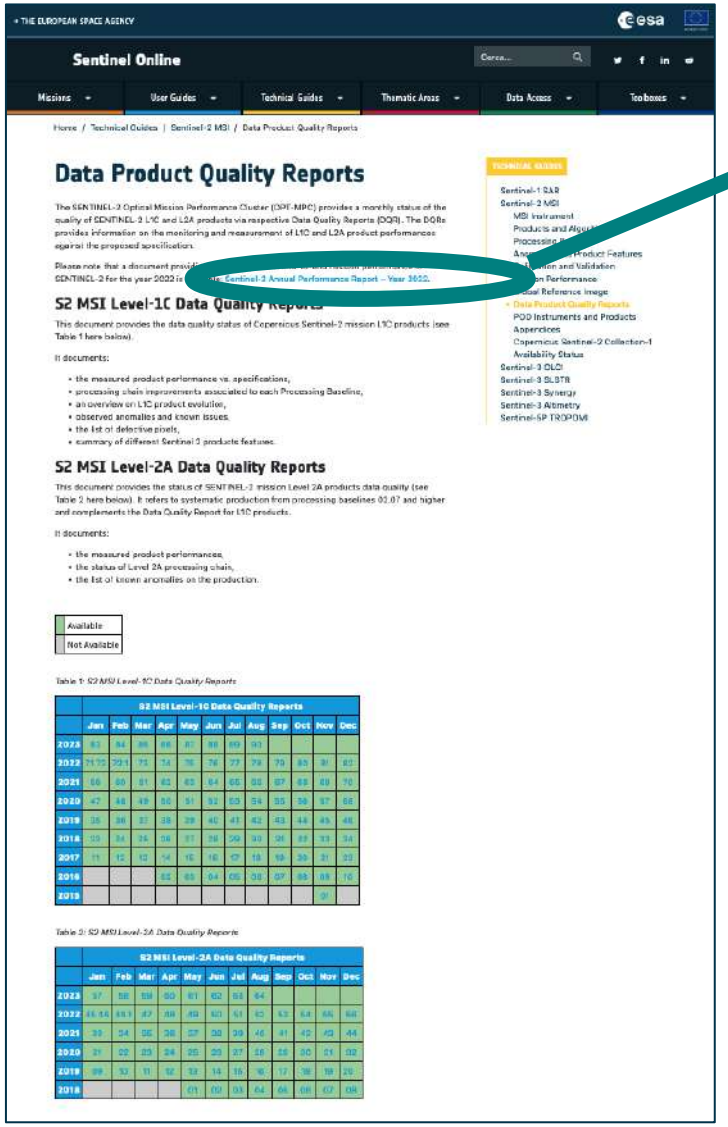
Table 2: S2 MSI Level-2A Data Quality Reports

	S2 MSI Level-2A Data Quality Reports											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2023	57	58	59	60	61	62	63					
2022	45 46	46.1	47	48	49	50	51	52	53	54	55	56
2021	33	34	35	36	37	38	39	40	41	42	43	44
2020	21	22	23	24	25	26	27	28	29	30	31	32
2019	09	10	11	12	13	14	15	16	17	18	19	20
2018					01	02	03	04	05	06	07	08



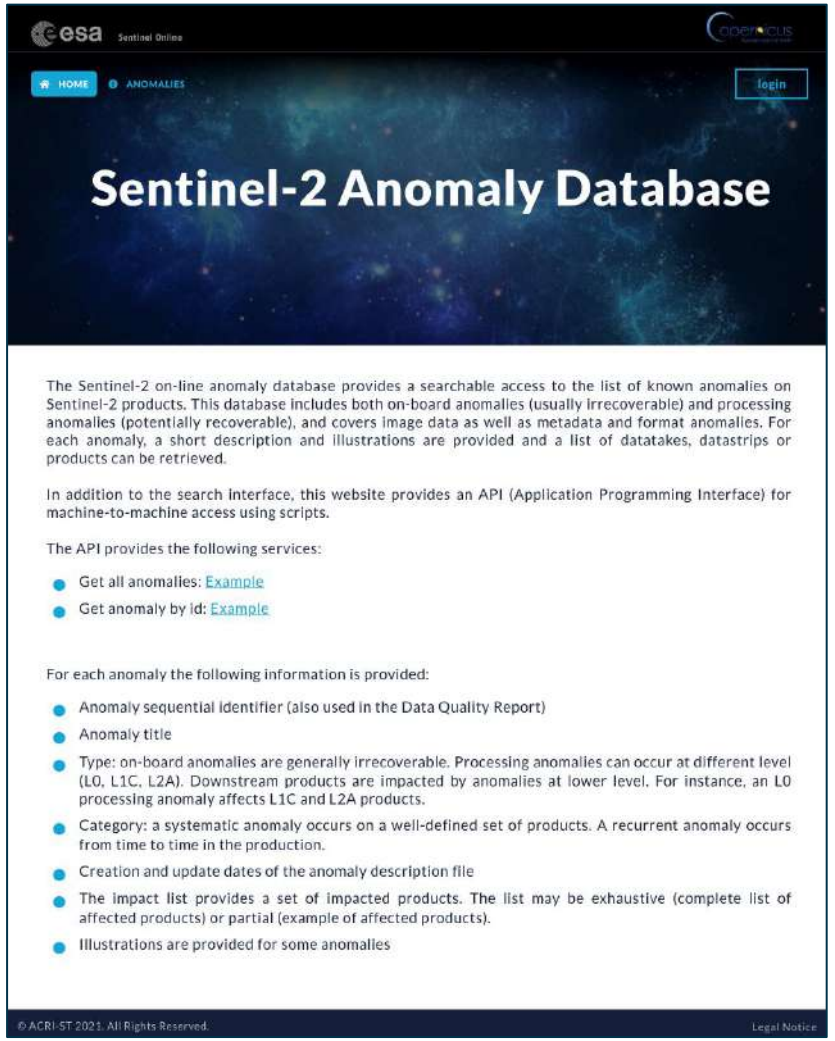


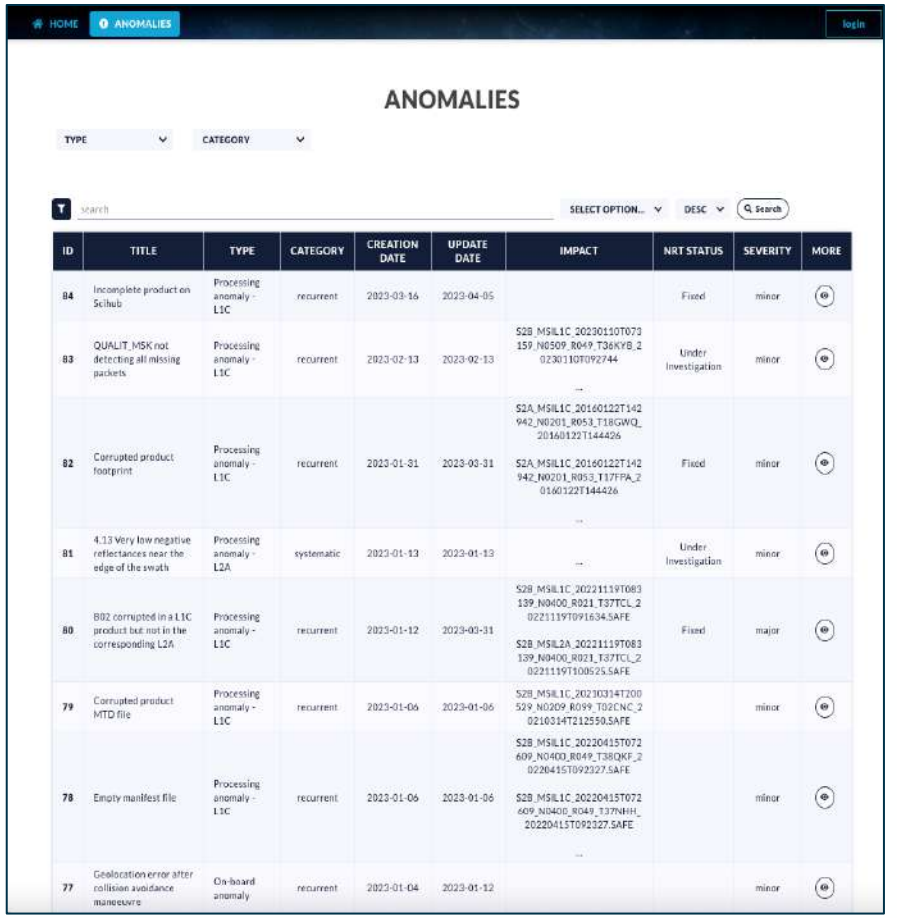
S2 Products Perfomance Reporting (2/2)



Sentinel-2 Annual Performance Report

S2 Anomaly Database





It includes an online query system to allow users to request information on the quality status of a given product through an API.

The query can be performed by:

- Product
- List of products
- Sensing orbit number
- Sensing date
- Processing baseline

https://sentinels.copernicus.eu/ca/web/sentinel/user-guides/sentinel-2-msi

S2 New Spectral Response Function (v 3.1)

PROGRAMME OF THE EUROPEAN UNION

co-funded with

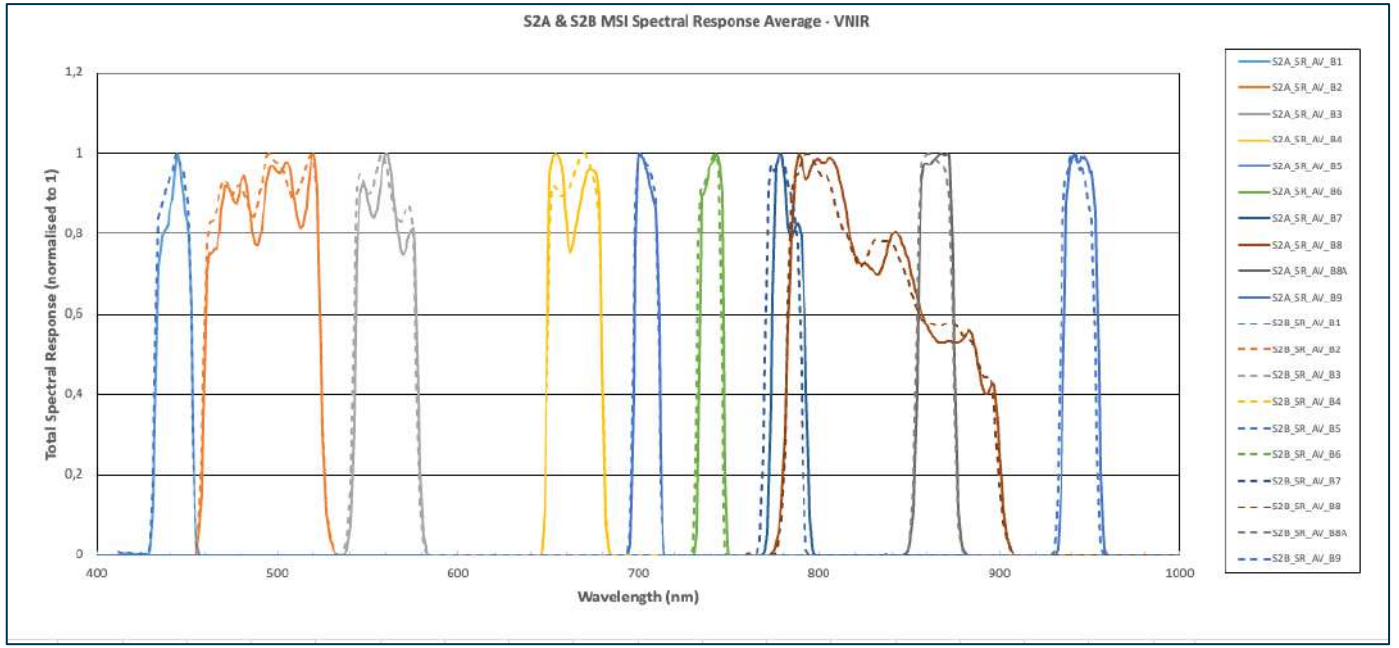
Sentinel 2 Document Library

Sentinel-2 Spectral Response Functions (S2-SRF)

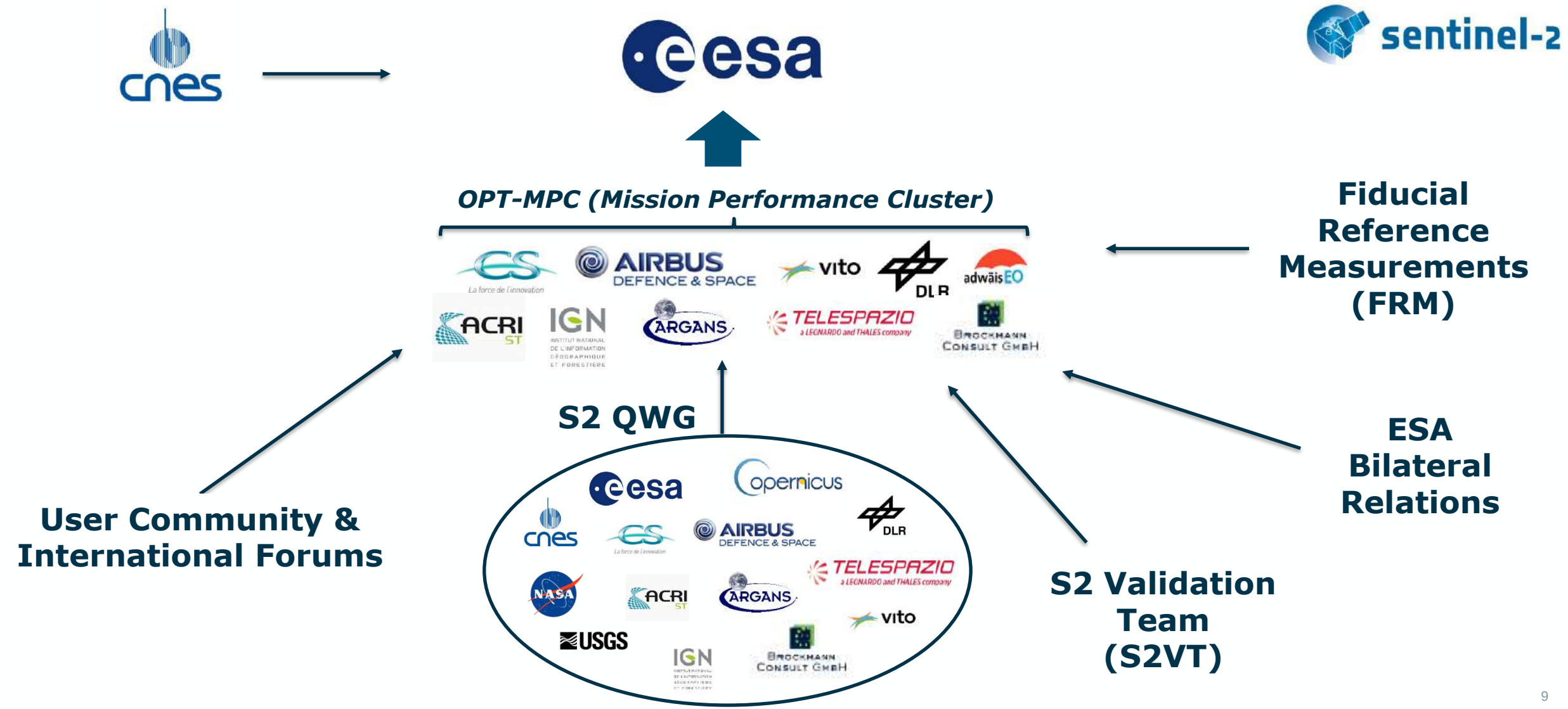
This spreadsheet contains the measured spectral responses for each band of the Sentinel-2 MultiSpectral Instrument (MSI) for the different satellite units. Compared to previous issue (3.0), this new version slight changes the central wavelengths for band B02 of S2A and S2B, and band B01 of S2A, along with slight changes of the Full Width Half Maximum (FMWH) for most of the bands.

Download XLS

REFERENCE	COPE-GSEG-EOPG-TN-15-0007
FORMAT	xlsx
ISSUE	3.1
DATE	21 June 2022
AUTHORSHIP	ESA
PAGES	5
KEYWORDS	Sentinel-2 Spectral Response Functions
TYPE	Technical Document



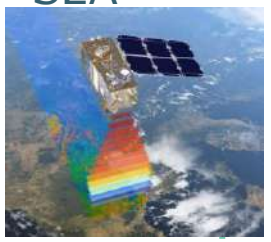
S2 Data Quality Framework



Sentinel-2 Data: where are we now?

S2 Timeline – Level-1C (TOA)

S2A



S2B

2nd S2VT | 3rd S2VT | 4th S2VT | 5th S2VT | 6th S2VT

	2015	2016	2017	2018	2019	2020	2021	2022	2023
Sentinel-2A									
Sentinel-2B									
Processing Baseline (PB)	02.00, 02.01, 02.02, 02.04	02.04	02.05	02.06	02.07	02.08	02.09	**03.00**, **03.01**	**04.00**	**05.09**
Product Specification Document (PSD)	11.00, 12.00, 13.1, 13.1	13.1	13.2	14.1/14.2	14.3	14.4/14.5	**14.6**	**14.9**	

S2 Timeline – Level-2A (BOA)

2nd S2VT | 3rd S2VT | 4th S2VT | 5th S2VT | 6th S2VT

	2018	2019	2020	2021	2022	2023
Sentinel-2A						
Sentinel-2B						
Processing Baseline (PB)	02.07, 02.08, 02.09, 02.10	02.11, 02.12, 02.13	02.14	**03.00**, **03.01**	**04.00**	**05.09**
Product Specification Document (PSD)	14.4/14.5			**14.6**	**14.9**	

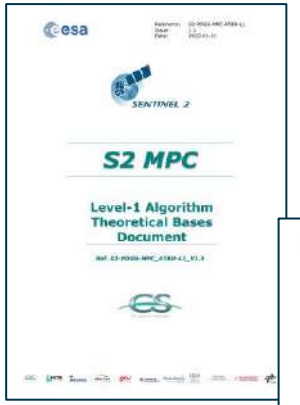
S2 Data Products – Major Products Updates

PB 05.09 is currently used systematically since 6th December 2022 and includes:

L1C • Improvement of quality mask for radiometric saturation
L2A • Identification of defective pixels from missing instrument source packets in L2A Scene Classification map

L1C ATBD (Algorithm Theoretical Basis Document) v1.1 is publicly available on Sentinel Online (Sentinel-2 Document Library section) since March 2023

https://sentinels.copernicus.eu/documents/247904/446933/Sentinel-2-Level-1-Algorithm-Theoretical-Basis-Document-ATBD.pdf/827fdad1-e3af-96af-e437-964e2aa8c35d?t=1679388210651



L2A ATBD (Algorithm Theoretical Basis Document) v2.10 is publicly available on Sentinel Online (Sentinel-2 Document Library section) online since January 2022

https://step.esa.int/main/snap-supported-plugins/sen2cor/sen2cor-v2-10/

Sen2Cor Toolbox v2.11 released on the STEP webpage in December 2022

https://step.esa.int/main/snap-supported-plugins/sen2cor/sen2cor-v2-11/

S2 L2A – CEOS ARD

Since 25th January 2022 Sentinel-2 L2A data are **Analysis Ready Data** according to CEOS ARD Specifications at Threshold Level

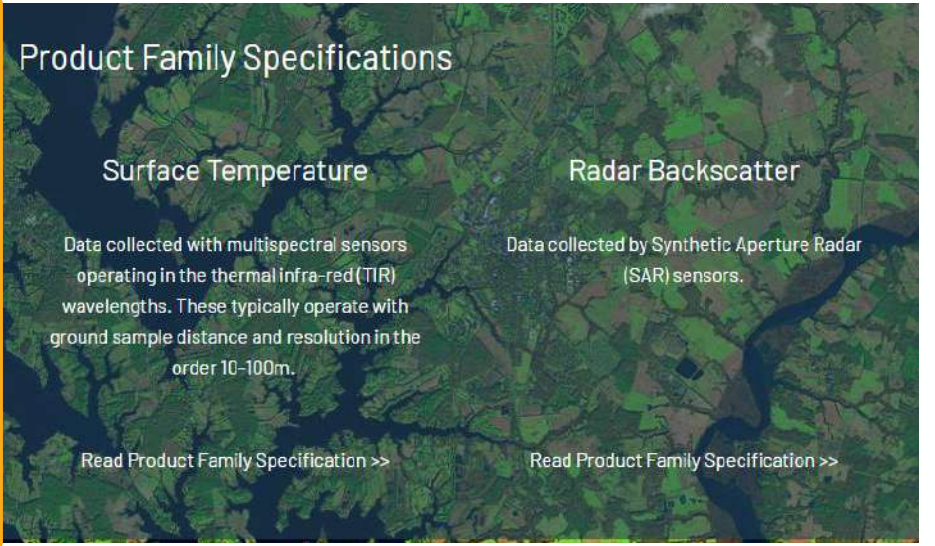
CEOS

CEOS Analysis-Ready Datasets

The following table summarises all of the satellite EO datasets that have been assessed as CEOS Analysis Ready Data (CEOS ARD). DOI links are provided for access, along with links to further information, sample products, and the completed CEOS ARD self-assessment and peer review outcome documents.

Product	CEOS ARD Type	PFS Version	Agency	Mission(s)	Threshold Specification	Targ Specific
Landsat Collection 2	Surface Reflectance	v5.0	USGS	Landsat 4, 5, 7, 8, 9	100%	81%
Landsat Collection 2	Surface Temperature	v5.0	USGS	Landsat 4, 5, 7, 8, 9	100%	83%
Sentinel-2 Level-2A	Surface Reflectance	v5.0	ESA	Sentinel-2A, 2B	100%	Not asse
EnMAP	Surface Reflectance	v5.0	DLR	EnMAP	100%	Not asse

ceos.org/ard



S2 GRI : Public Release (1/3)

PROGRAMME OF THE EUROPEAN UNION · Copernicus Europe's eyes on Earth · co-funded with esa

Since 12th July 2023 the Copernicus Sentinel-2 Global Reference Image (GRI) is available on the Sentinel Online website for download.

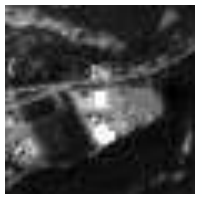
The following 4 versions of the GRI are made available:

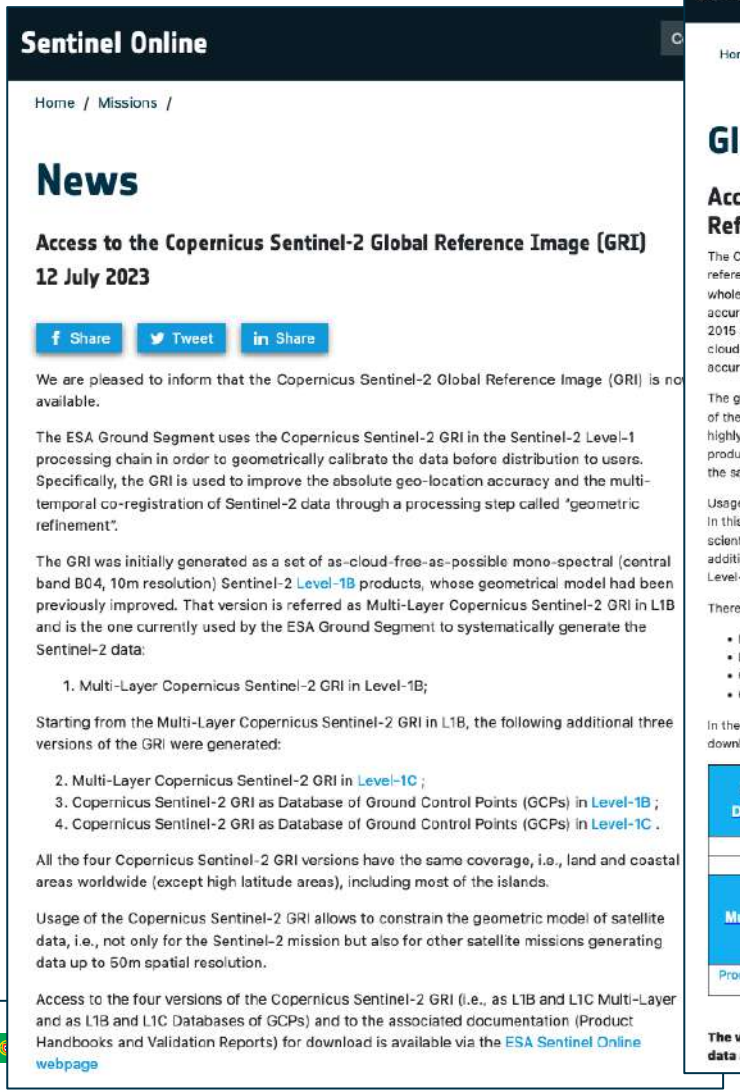
- **Multi-Layer** Copernicus Sentinel-2 GRI in Level-1B (**L1B**);
- **Multi-Layer** Copernicus Sentinel-2 GRI in Level-1C (**L1C**);
- Copernicus Sentinel-2 GRI as **Database of GCPs** in **L1B**;
- Copernicus Sentinel-2 GRI as **Database of GCPs** in **L1C**.

+ related Documentation:

- Product Handbook
- Validation Report

STAC SpatioTemporal Asset Catalog




Sentinel Online

Home / Missions /

News

Access to the Copernicus Sentinel-2 Global Reference Image (GRI)
12 July 2023

Share Tweet Share

We are pleased to inform that the Copernicus Sentinel-2 Global Reference Image (GRI) is no available.

The ESA Ground Segment uses the Copernicus Sentinel-2 GRI in the Sentinel-2 Level-1 processing chain in order to geometrically calibrate the data before distribution to users. Specifically, the GRI is used to improve the absolute geo-location accuracy and the multi-temporal co-registration of Sentinel-2 data through a processing step called "geometric refinement".

The GRI was initially generated as a set of as-cloud-free-as-possible mono-spectral (central band B04, 10m resolution) Sentinel-2 Level-1B products, whose geometrical model had been previously improved. That version is referred as Multi-Layer Copernicus Sentinel-2 GRI in L1B and is the one currently used by the ESA Ground Segment to systematically generate the Sentinel-2 data:

1. Multi-Layer Copernicus Sentinel-2 GRI in Level-1B;

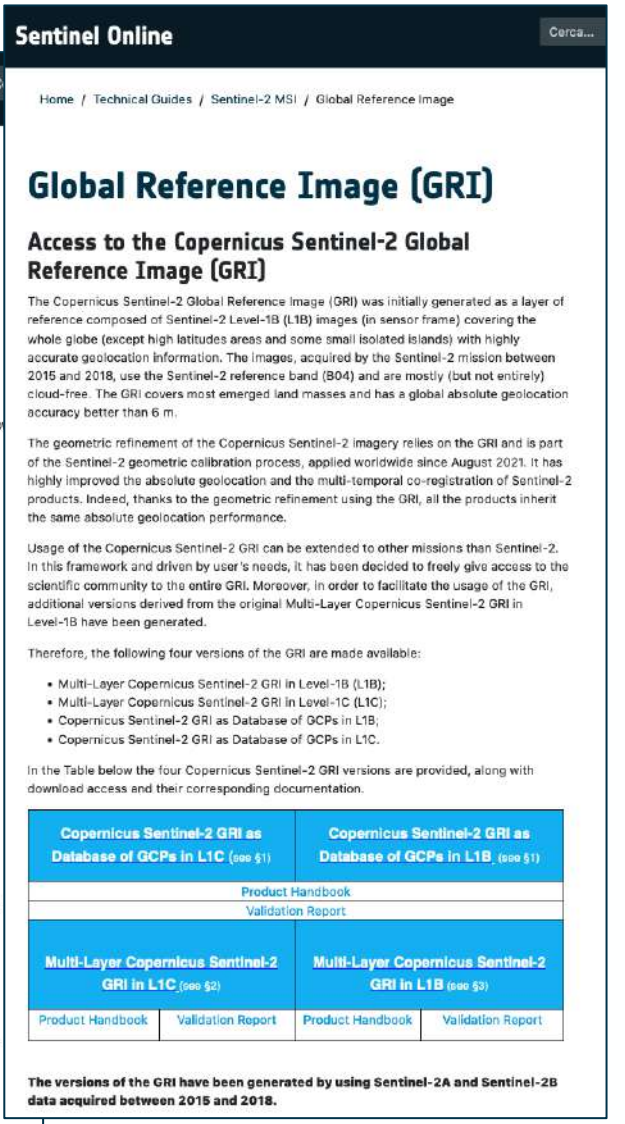
Starting from the Multi-Layer Copernicus Sentinel-2 GRI in L1B, the following additional three versions of the GRI were generated:

2. Multi-Layer Copernicus Sentinel-2 GRI in Level-1C ;
3. Copernicus Sentinel-2 GRI as Database of Ground Control Points (GCPs) in Level-1B ;
4. Copernicus Sentinel-2 GRI as Database of Ground Control Points (GCPs) in Level-1C .

All the four Copernicus Sentinel-2 GRI versions have the same coverage, i.e., land and coastal areas worldwide (except high latitude areas), including most of the islands.

Usage of the Copernicus Sentinel-2 GRI allows to constrain the geometric model of satellite data, i.e., not only for the Sentinel-2 mission but also for other satellite missions generating data up to 50m spatial resolution.

Access to the four versions of the Copernicus Sentinel-2 GRI (i.e., as L1B and L1C Multi-Layer and as L1B and L1C Databases of GCPs) and to the associated documentation (Product Handbooks and Validation Reports) for download is available via the ESA Sentinel Online webpage


Sentinel Online

Cerca...

Home / Technical Guides / Sentinel-2 MSI / Global Reference Image

Global Reference Image (GRI)

Access to the Copernicus Sentinel-2 Global Reference Image (GRI)

The Copernicus Sentinel-2 Global Reference Image (GRI) was initially generated as a layer of reference composed of Sentinel-2 Level-1B (L1B) images (in sensor frame) covering the whole globe (except high latitudes areas and some small isolated islands) with highly accurate geolocation information. The images, acquired by the Sentinel-2 mission between 2015 and 2018, use the Sentinel-2 reference band (B04) and are mostly (but not entirely) cloud-free. The GRI covers most emerged land masses and has a global absolute geolocation accuracy better than 6 m.

The geometric refinement of the Copernicus Sentinel-2 imagery relies on the GRI and is part of the Sentinel-2 geometric calibration process, applied worldwide since August 2021. It has highly improved the absolute geolocation and the multi-temporal co-registration of Sentinel-2 products. Indeed, thanks to the geometric refinement using the GRI, all the products inherit the same absolute geolocation performance.

Usage of the Copernicus Sentinel-2 GRI can be extended to other missions than Sentinel-2. In this framework and driven by user's needs, it has been decided to freely give access to the scientific community to the entire GRI. Moreover, in order to facilitate the usage of the GRI, additional versions derived from the original Multi-Layer Copernicus Sentinel-2 GRI in Level-1B have been generated.

Therefore, the following four versions of the GRI are made available:

- Multi-Layer Copernicus Sentinel-2 GRI in Level-1B (L1B);
- Multi-Layer Copernicus Sentinel-2 GRI in Level-1C (L1C);
- Copernicus Sentinel-2 GRI as Database of GCPs in L1B;
- Copernicus Sentinel-2 GRI as Database of GCPs in L1C.

In the Table below the four Copernicus Sentinel-2 GRI versions are provided, along with download access and their corresponding documentation.

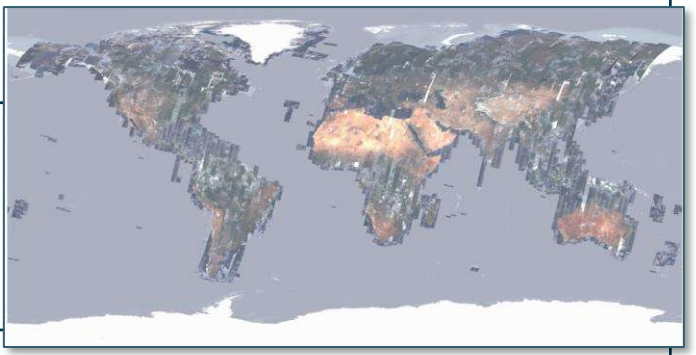
Copernicus Sentinel-2 GRI as Database of GCPs in L1C (see §1)		Copernicus Sentinel-2 GRI as Database of GCPs in L1B (see §1)	
Product Handbook			
Validation Report			
Multi-Layer Copernicus Sentinel-2 GRI in L1C (see §2)		Multi-Layer Copernicus Sentinel-2 GRI in L1B (see §3)	
Product Handbook	Validation Report	Product Handbook	Validation Report

The versions of the GRI have been generated by using Sentinel-2A and Sentinel-2B data acquired between 2015 and 2018.

S2 GRI : Public Release (2/3)

- **Multi-Layer** Copernicus Sentinel-2 GRI in Level-1B (**L1B**)

It is the S2 GRI version currently used by the S2 processor and it is a full repeat cycle dataset of well-localized and as cloud-free as possible mono-spectral (band 4) Sentinel-2 Level-1B products (i.e. in sensor geometry).



- **Multi-Layer** Copernicus Sentinel-2 GRI in Level-1C (**L1C**)

It is the S2 GRI converted from L1B to L1C geometry.

- Copernicus Sentinel-2 GRI as **Database of GCPs** in **L1B**
- Copernicus Sentinel-2 GRI as **Database of GCPs** in **L1C**

The Multi-Layer S2 GRI might be difficult to use. More for experts and not user friendly.
Therefore, the Multi-Layer S2 GRI have been converted into Databases of GCPs.

- No Copyright: Free & Open
- Easily identifiable GCPs: crossroad, house corner, isolated rock, etc.
- Same accuracy as the current GRI version
- Perennial & robust to seasonal effects
- Same performance as achieved by the current GRI version
- Fully validated
- Coverage: worldwide
- Usage of Copernicus DEM @30m

S2 GRI : Public Release (3/3)

Sentinel Online Cerca...

Home / Technical Guides / Sentinel-2 MSI / Global Reference Image

Global Reference Image (GRI)

Access to the Copernicus Sentinel-2 Global Reference Image (GRI)

The Copernicus Sentinel-2 Global Reference Image (GRI) was initially generated as a layer of reference composed of Sentinel-2 Level-1B (L1B) images (in sensor frame) covering the whole globe (except high latitudes areas and some small isolated islands) with highly accurate geolocation information. The images, acquired by the Sentinel-2 mission between 2015 and 2018, use the Sentinel-2 reference band (B04) and are mostly (but not entirely) cloud-free. The GRI covers most emerged land masses and has a global absolute geolocation accuracy better than 6 m.

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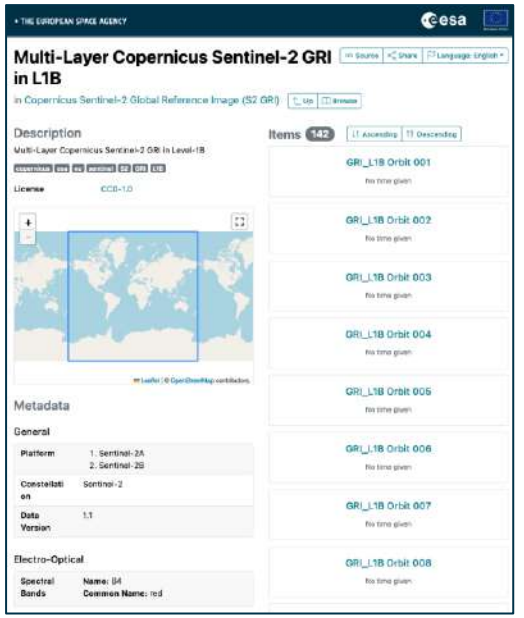
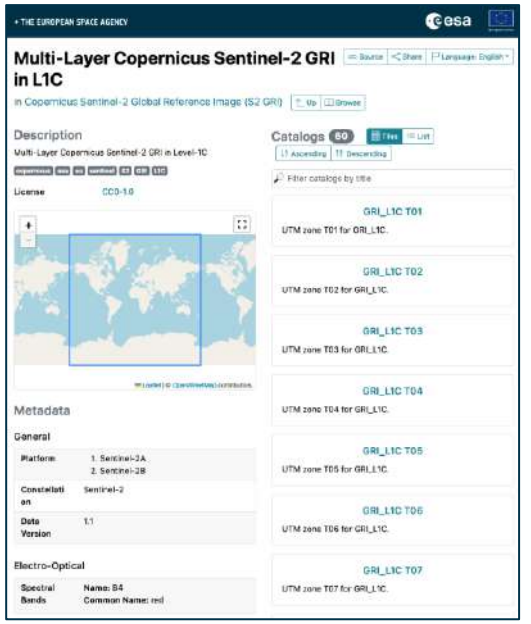
- Copernicus Sentinel-2 GRI as Database of GCPs in L1B;
- Copernicus Sentinel-2 GRI as Database of GCPs in L1C.

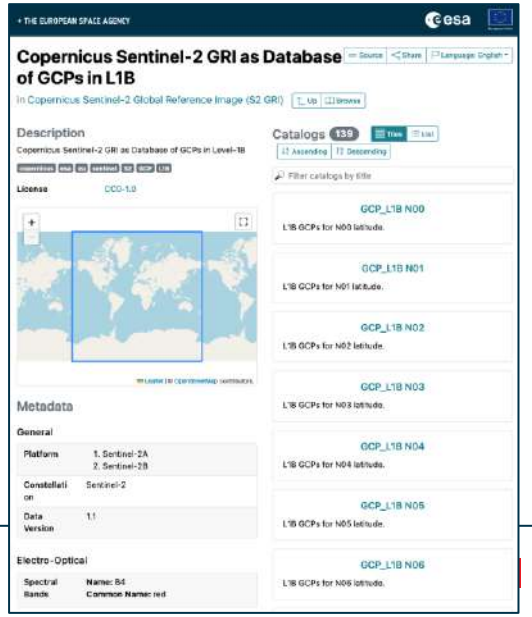
In the Table below the four Copernicus Sentinel-2 GRI versions are provided, along with download access and their corresponding documentation.

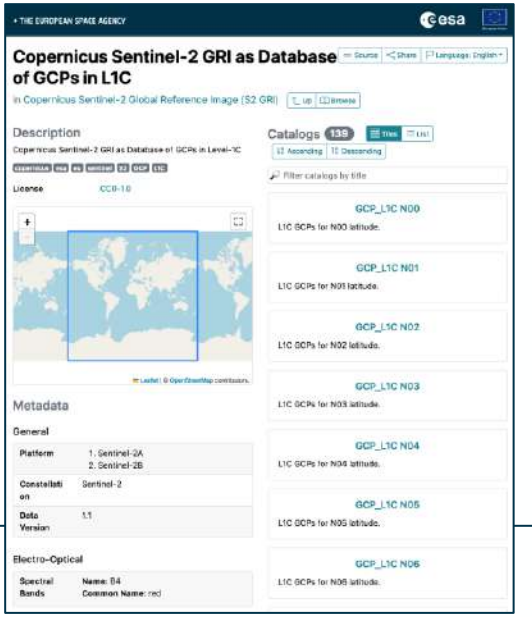
Copernicus Sentinel-2 GRI as Database of GCPs in L1C (see §1)		Copernicus Sentinel-2 GRI as Database of GCPs in L1B (see §1)	
Product Handbook			
Validation Report			
Multi-Layer Copernicus Sentinel-2 GRI in L1C (see §2)		Multi-Layer Copernicus Sentinel-2 GRI in L1B (see §3)	
Product Handbook	Validation Report	Product Handbook	Validation Report

The versions of the GRI have been generated by using Sentinel-2A and Sentinel-2B data acquired between 2015 and 2018.



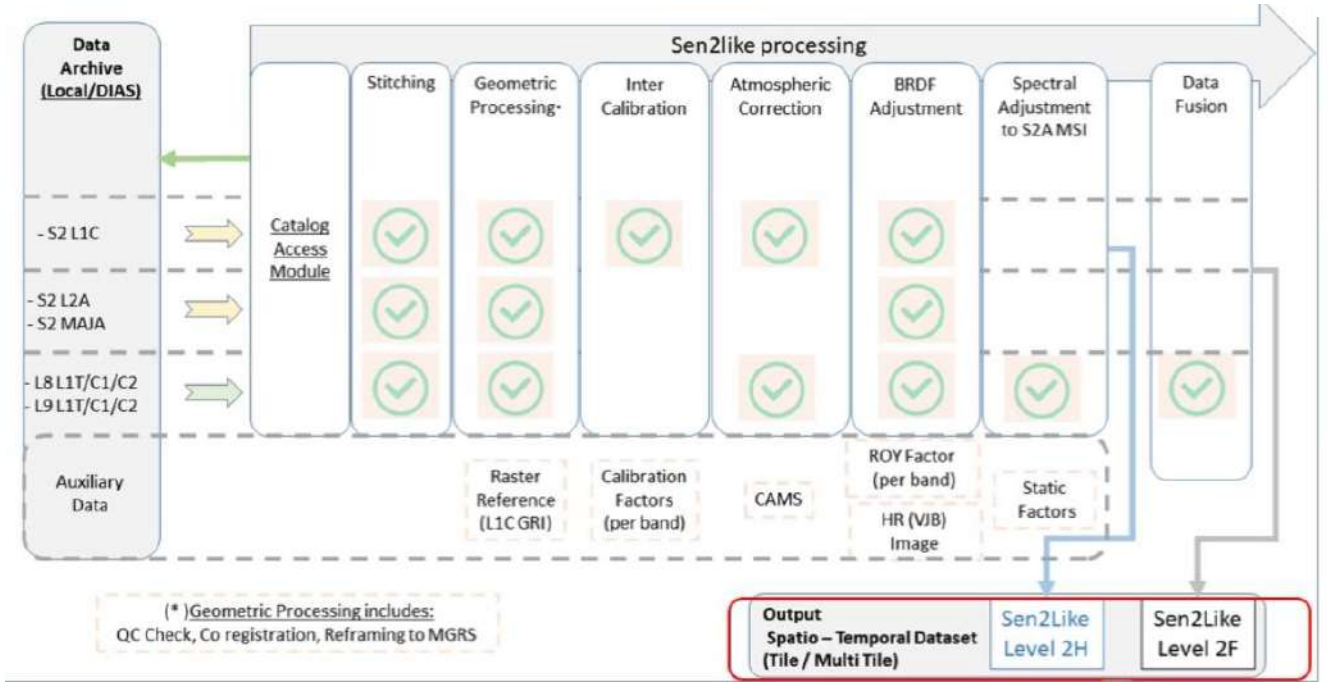






S2 Level-2H and Level-2F Pilot Products

- ✓ **Harmonisation** includes consistent atmospheric corrections, spectral adjustments, BRDF adjustments and re-gridding.
- ✓ **Fusion** goes beyond bringing the data to the same spatial resolution.



GOAL:

to provide **S2-like surface reflectance** with increased frequency through a harmonisation/fusion process **combining data from different sensors**.

CURRENT STATUS:

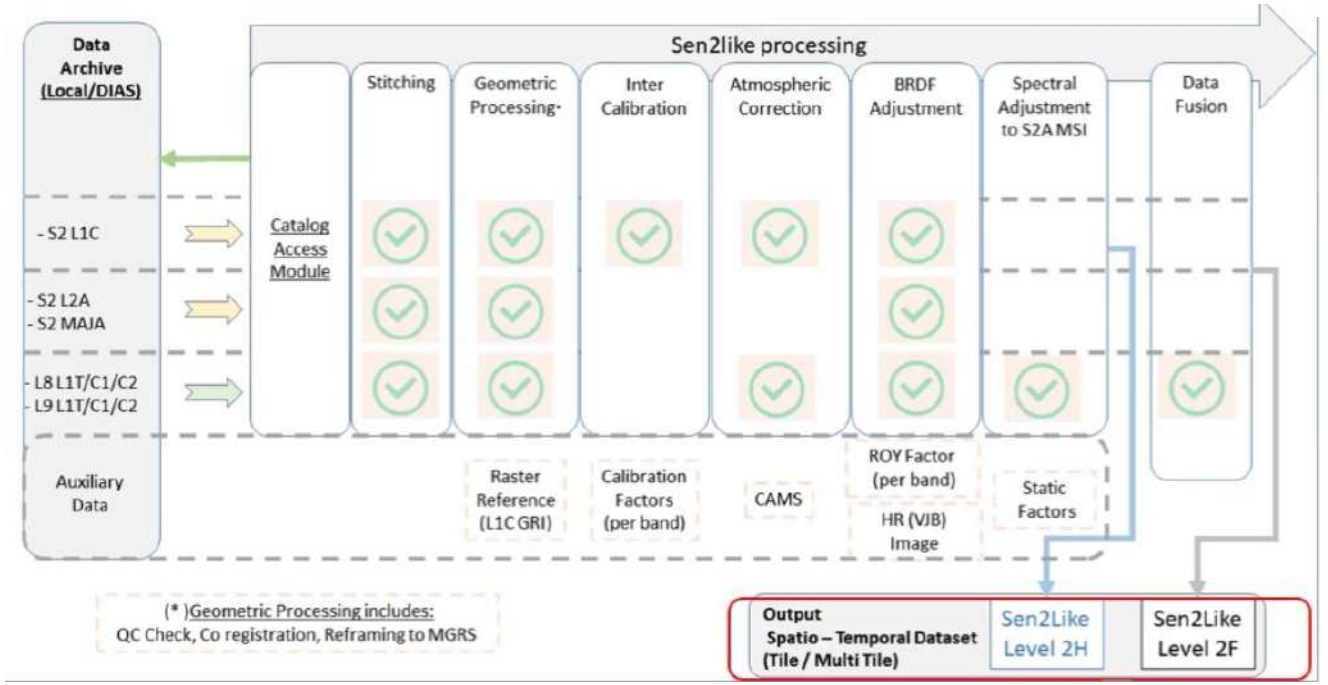
- Sen2Like Processor is able to combining **Sentinel-2** and **Landsat-8/9** using SMAC and Sen2Cor**.**
- L2H and L2F pilot production over Belgium available.
- Integration of ASI's **PRISMA** hyperspectral mission data [Sen2Like 4.4]

2 new pilot ARD products
(Not part of the operational production)

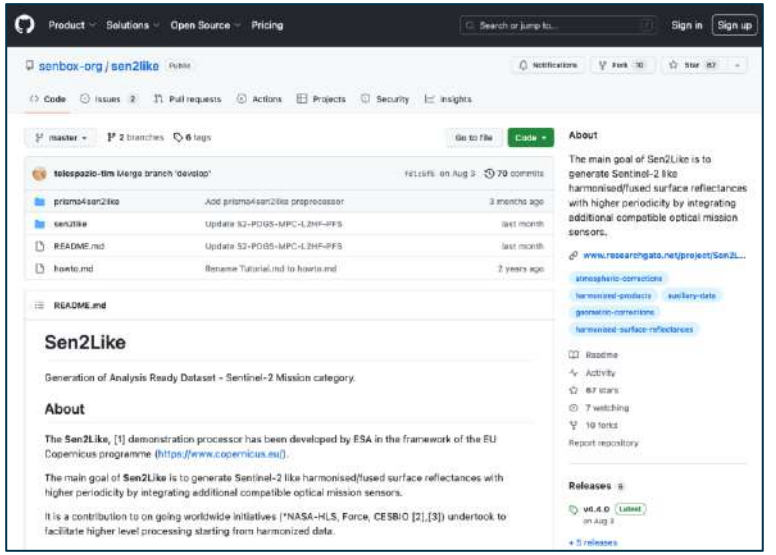
- ✓ **Level-2H:** *harmonised Sentinel-2 and Landsat 8/9 products (native spatial resolutions kept):*
  - ➢ **L2H-S2**: B01 B02 B03 B04 B8A B11 B12 + red-edge bands + B8
  - ➢ **L2H-L8**: B01 B02 B03 B04 B05 B06 B07 + (B08 B10 B11)
- ✓ **Level-2F:** *fused Landsat 8/9 to Sentinel-2 products (S2 spatial resolution for Landsat data):*
  - ➢ **L2F-S2**: B01 B02 B03 B04 B8A B11 B12 + red-edge bands + B8
  - ➢ **L2F-L8**: B01 B02 B03 B04 B05 B06 B07 + (B08 B10 B11)

S2 Level-2H and Level-2F Pilot Products

- ✓ **Harmonisation** includes consistent atmospheric corrections, spectral adjustments, BRDF adjustments and re-gridding.
- ✓ **Fusion** goes beyond bringing the data to the same spatial resolution.



Processor (Sen2Like 4.4) available on GitHub: https://github.com/senbox-org/sen2like



ON-GOING STEPS:

- **On-demand production** of L2H and L2F data on the openEO platform.
- BRDF validation using specific DRONEs campaigns (1st campaign already done)

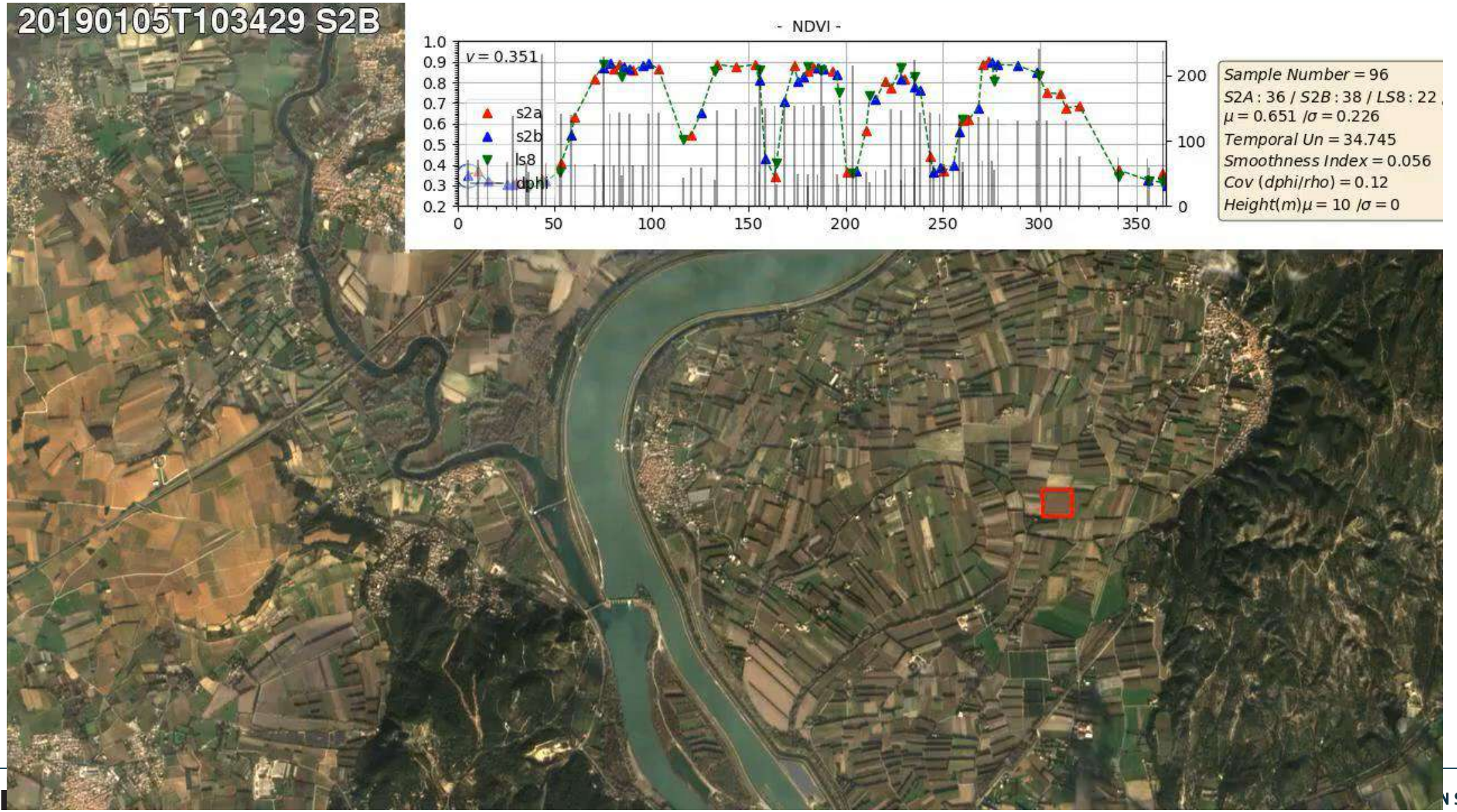
Landsat-8 Level-2H Pilot Product

L2H L8 – 22/07/2022 (30m)

Landsat-8 Level-2F Pilot Product

L2F L8 – 22/07/2022 (10m)

S2 and Landsat-8 Level-2F Animation (NDVI)



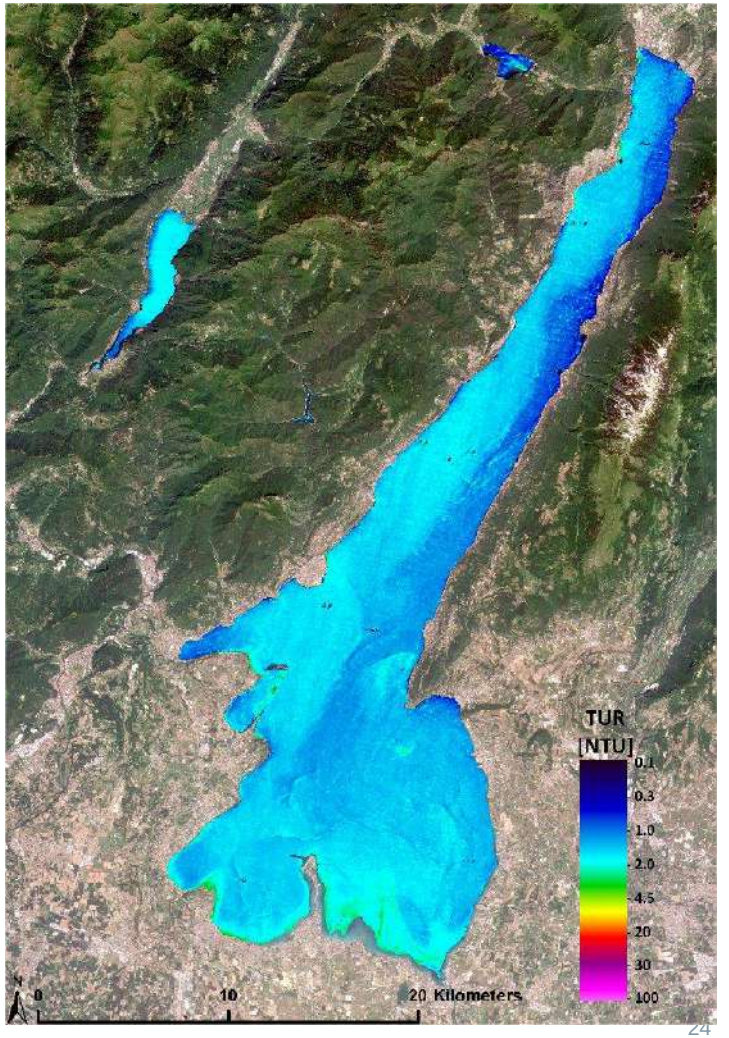
Work in Progress

S2 L2A Acquatic Reflectance Layer

Development of the algorithm for the generation of an **Aquatic Reflectance Layer** into the S2 L2A product is on-going

RATIONALE:

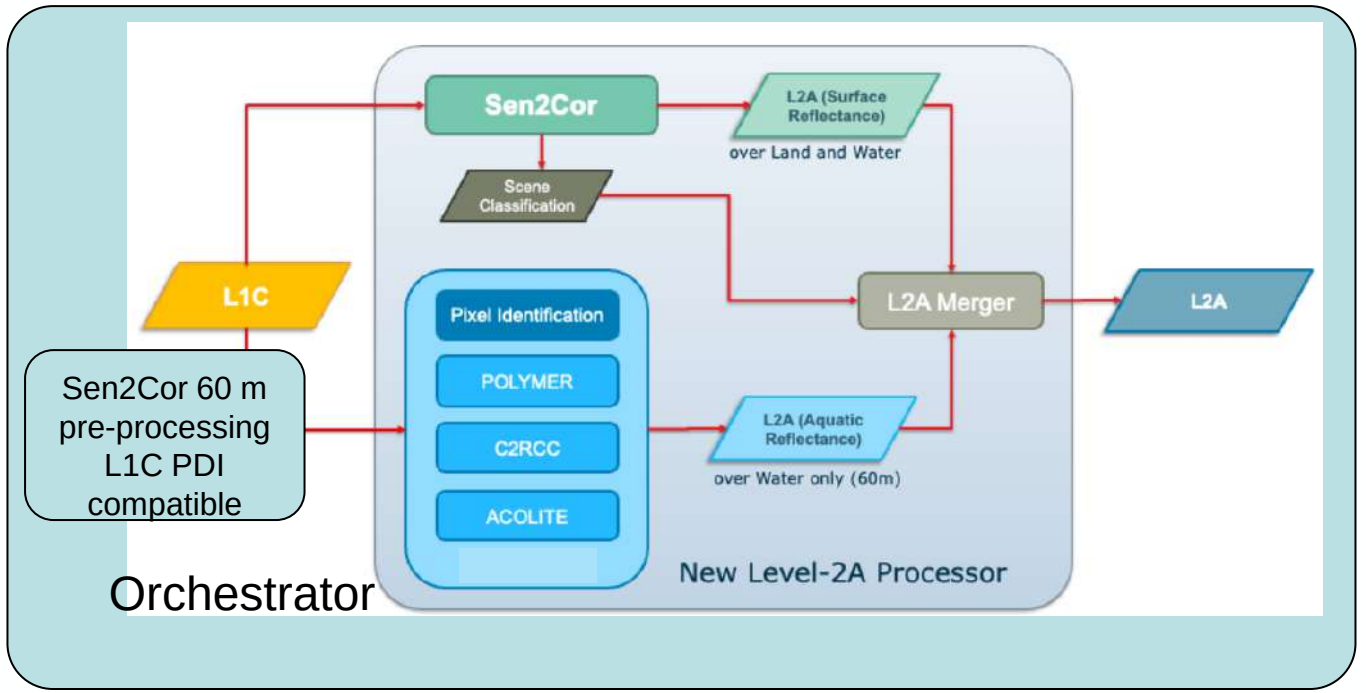
- Sentinel-2 data are used for water (quality) applications
  - ✓ Publications, commercial services
  - ✓ Copernicus Land Service (in-land water)
  - ✓ Copernicus Marine Service
- Sen2Cor performance over water
  - ✓ It does not meet uncertainty requirements for aquatic reflectances needed for quantitative water quality parameter retrieval (Chl-a, TSM, CDOM, …)
- Conclusion:
  - ✓ Developing the algorithm for providing an aquatic reflectance layer as part of the Level-2A product using a dedicated water AC approach
  - ✓ Focus: Copernicus Services



End of the activity: Q4 2024

S2 L2A Acquatic Reflectance Layer

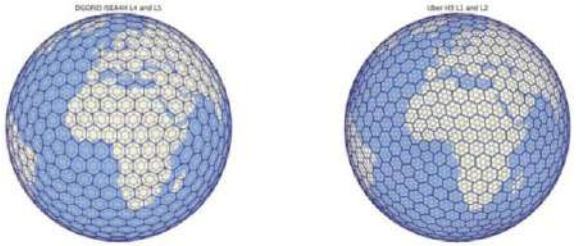
Development of the algorithm for the generation of an **Aquatic Reflectance Layer** into the S2 L2A product is on-going



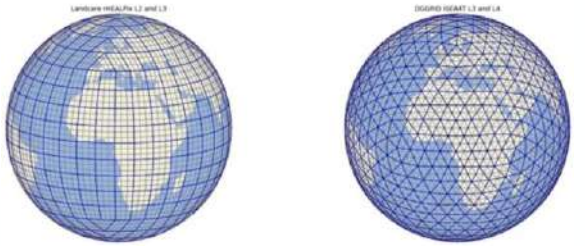
Algorithm	Pros
C2RCC (C2X)	Better results on Clear waters
ACOLITE-DFS	Good results for Turbid waters
POLYMER	Provides greater retrieval power in the most difficult circumstances (sunglint, highly absorbing waters)

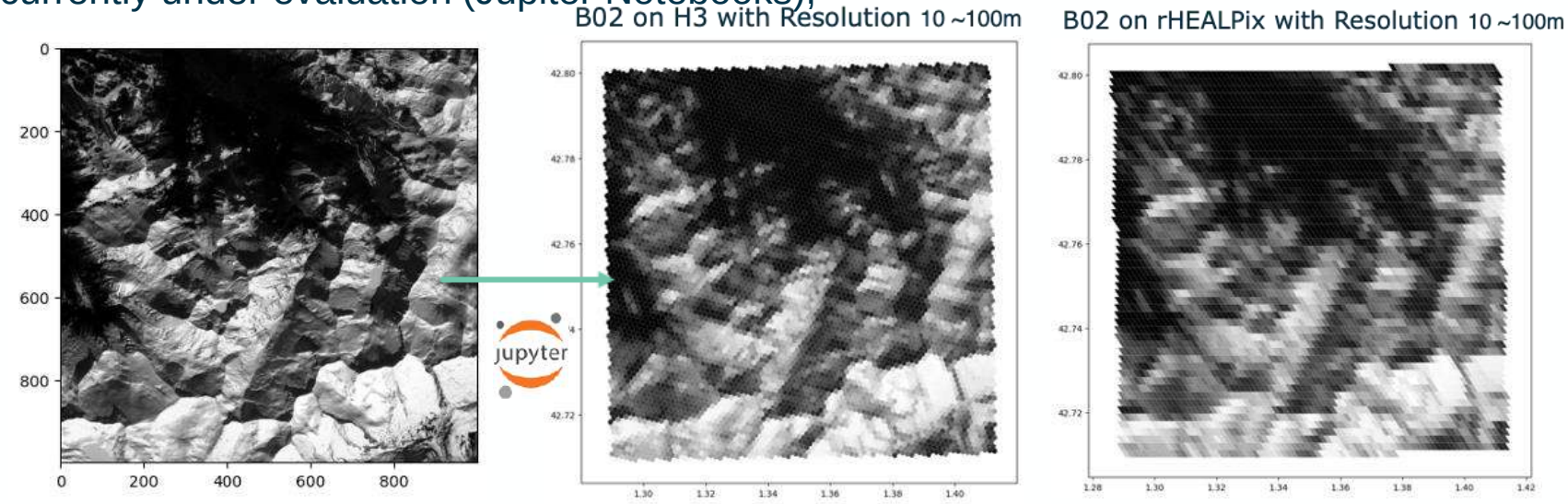
DGGS (Discrete Global Grid System)

- Need to have a **unified global grid** which **minimizes geometric distortions**.
- Need to merge data from different sensors in a **global consistent geometry**.
- Need to explore **innovative approaches** to organize, store, manage and analyze EO data.
- **DGGS** can offer a new way for geospatial information to be handled in a manner that more accurately reflects the Earth.



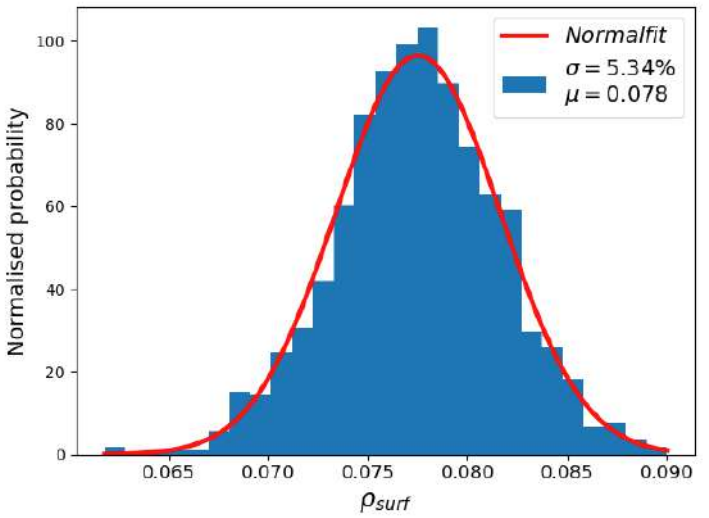
- Feasibility Study for assessing the usage of **DGGS** (Discrete Global Grid System) for Sentinel-2 started in Spring 2022.
- A set of DGGS candidates for Sentinel-2 has been assessed considering the following key aspects: radiometry preservation, geometric distortions, discrete resolution levels, data retrieval efficiency, software support, etc.
- A Proof of Concept demonstrator is currently under evaluation (Jupiter Notebooks);
- It would explore **H3** and **rHEALPix** and published as open-source tool on GitHub.





Sentinel-2 L1C and L2A RUT

- L1C Radiometric Uncertainty Tool (RUT): https://github.com/senbox-org/snap-rut (old version)
  - Update of the tool in order to ingest the new format of S2 L1C product is work in progress (i.e., from PB 04.00 onwards).
  - Preparation of the L1C RUT ATBD, User Manual and roadmap for future improvements
- L2A RUT (v1.0.0) released on github: https://github.com/gorronyo/S2-L2A-RUT
  - The release includes a brief user-guide



Surface reflectance distribution for Sentinel-2 L2A B5 at the Amazon forest

S2 L1C Evolutions – Under Consideration

A number of potential evolutions for the L1C product has been studied by the MPC and are currently under evaluation by ESA:

- improvement of missing instrument source packets tracking (% for band) in the S2 metadata;
- reporting of additional information in the S2 metadata concerning the used DEM (e.g. Copernicus DEM, DEM resolution, DEM version, DOI, etc.);
- improvement of the pixel-dependent cross-talk correction algorithm.

S2 L2A Evolutions – Under Consideration

A number of potential evolutions for the L2A product has been studied by the MPC and are currently under evaluation by ESA:

- reading of the missing packets from L1C Tile metadata;
- reporting of additional information in the S2 metadata concerning the used DEM;
- replacement of “dark pixels” with class name “cast shadows” in the Scene Classification Layer;
- handling of « NA » for Aerosol Optical Thickness (AOT) retrieval in the L2A quality report in the product metadata;
- extension of “No Data” area of 1 pixel on the border of the swath;
- mitigation of negative reflectance values at the edge of the swath (due to overcorrection of the adjacency algorithm).

S2 Collection-1

The Processing Baseline identifier 05.00 tags every Sentinel-2 Collection-1 product generated with the on-going reprocessing activity.

What's new in Collection-1

- ✓ **Improved Geometric Performance**: Geometric Refinement using the GRI and usage of the 30m Copernicus Digital Elevation Model (DEM)
- ✓ **Harmonized radiometry** with alignment of S2B to S2A
- ✓ **Radiometric and Geometric Calibration Update**: Optimization of the applicability along-time of the successive radiometric and geometric calibrations
- ✓ **Quality Mask** in raster format and improved masks for radiometric saturation
- ✓ **Improved L2A processing algorithms** for scene classification and surface reflectance
- ✓ **Identification of defective pixels from missing instrument source packets** in the L2A Scene Classification layer
- ✓ **Compliance with the CEOS Analysis Ready Data (CEOS ARD)** specifications at Threshold level of the S2 Level-2A surface reflectance product

S2 Collection-1 Availability: Status

All historical data in the period spanning from the Sentinel-2A satellite launch back in **2015 until December 2021** are planned to be reprocessed by end of Q1 2024.

A dedicated **S2 Collection-1 Availability Status webpage on Sentinel Online** is periodically updated that reports about the reprocessed dataset and reprocessing status.

https://sentinels.copernicus.eu/web/sentinel/technical-guides/sentinel-2-msi/copernicus-sentinel-2-collection-1-availability-status

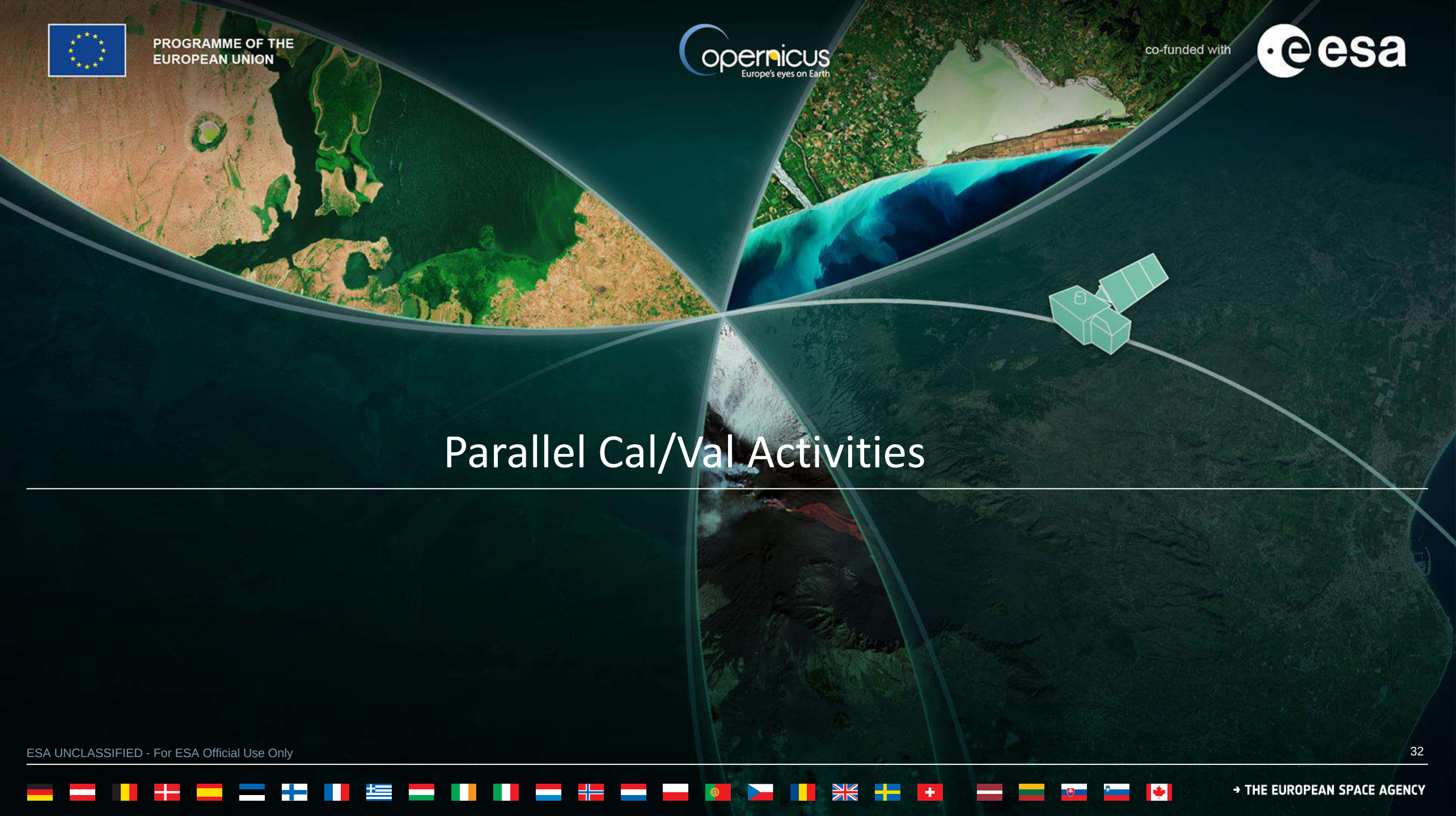
Distribution partners:

CREODIAS	https://creodias.eu
ONDA	https://www.onda-dias.eu
mundi WEB SERVICES	https://mundiwebservices.com

Updated availability by sensing time period (*)	Sentinel-2A	Sentinel-2B
Published	Up to October 2020	Up to October 2020
Next period in list	September-August 2020 then continuing in reverse chronological order of sensing time	September-August 2020 then continuing in reverse chronological order of sensing time

Last updated: 30/08/2023

(*) The general availability figures reported refer to the readiness of the Collection-1 Level-1C and Level-2A products for downstream distribution at the DIAS(es). The actual products availability in the DIAS inventories may temporarily differ considering the time to ingest the products in the respective DIAS repositories.



Parallel Cal/Val Activities

FRM4Veg

fiducial reference measurements for vegetation

PROGRAMME OF THE EUROPEAN UNION

Copernicus Europe's eyes on Earth

co-funded with esa

FRM4VEG is the ESA-founded project aiming at **applying the FRM concept to in-situ measurements of the several land products ESA distributes** (surface reflectance, the fraction of absorbed photosynthetically active radiation (FAPAR), canopy chlorophyll content, etc.).

Documents and **FRM Data** can be found on the FRM4Veg website:

https://frm4veg.org/

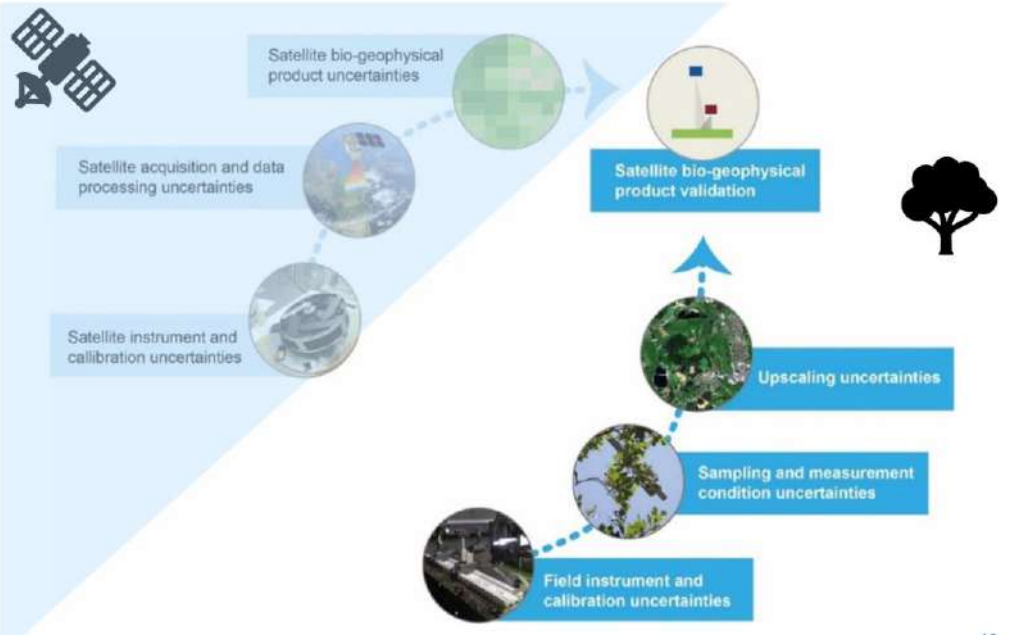
SENTINEL 2

proba-v

SENTINEL 3

flex

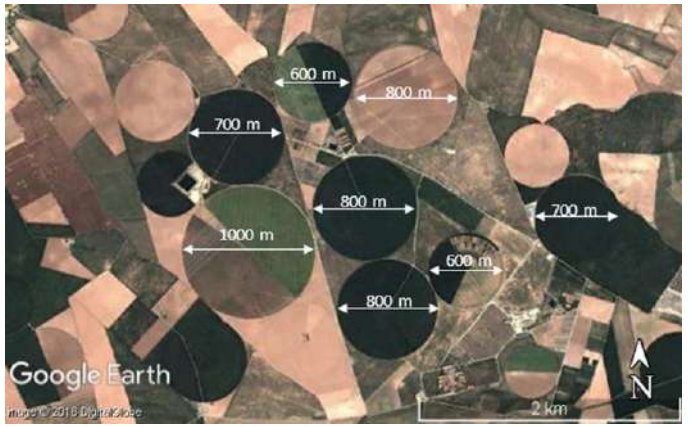
CHIME



SRIX4Veg (1/2)

SRIX4Veg = Surface Reflectance Inter-comparison eXercise for Vegetation

to ensure consensus on a Surface Reflectance Validation Protocol using drones



Requirements for participation:
UAV-mounted hyperspectral imagers capable of measuring 400 – 1000 nm contiguously; <= 10 nm spectral resolution.

SRIX4Veg (2/2)

Endorsed by:

Committee on Earth Observation Satellites

Funded by:

In cooperation with:

In partnership with:

Project partners:

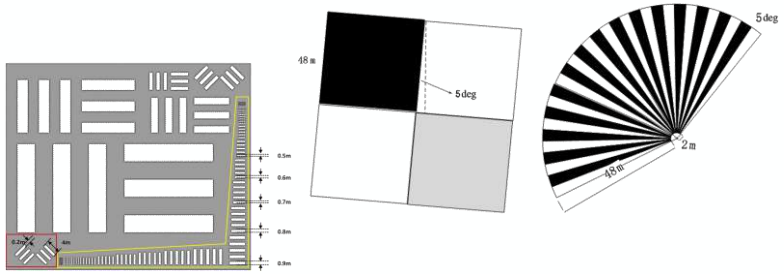
Contribute towards global community-agreed guidelines, protocols and procedures for UAV-based surface reflectance product validation!

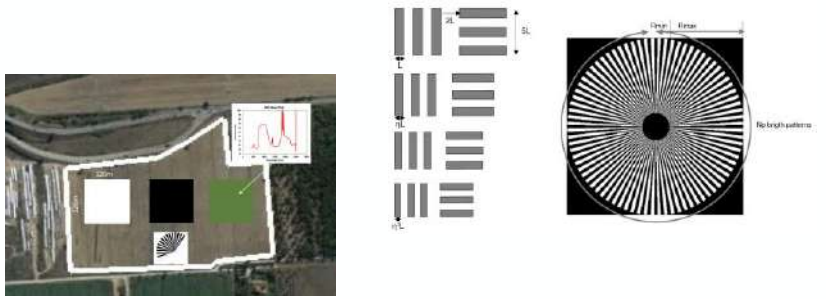
https://frm4veg.org/srix4veg/

Cal/Val Park (1/2)

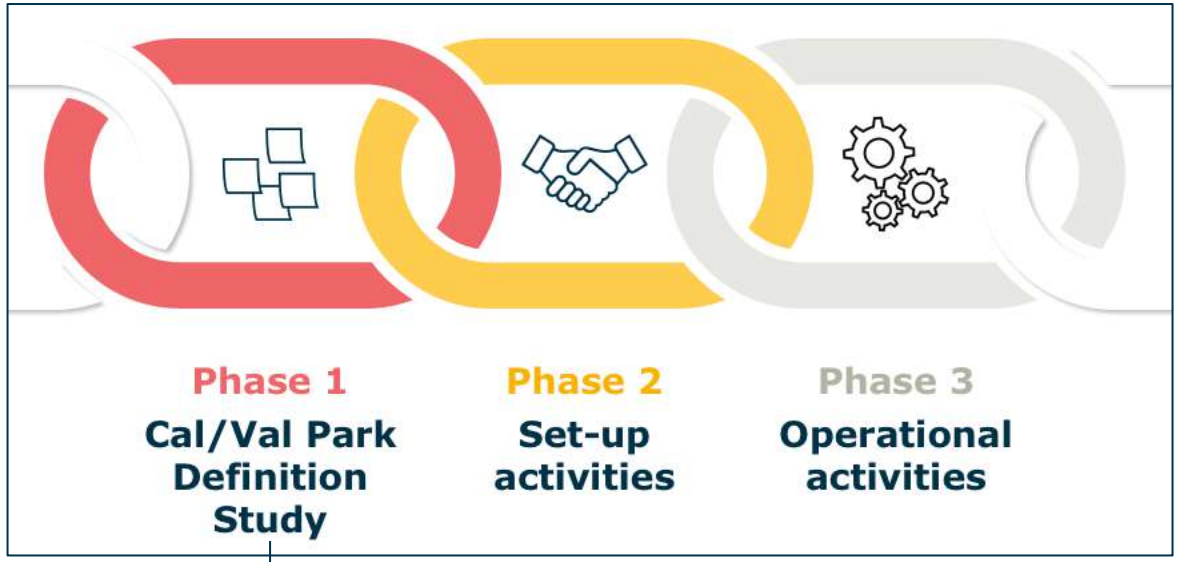
- ✓ Dedicated to **VHR** and **HR** optical missions;
- ✓ Open to both **multi-spectral** and **hyperspectral** missions;
- ✓ For both **TOA radiance and reflectance** and **BOA reflectance**;
- ✓ Open to be used by both the **"institutional space"** and the **"commercial/new space"**;
- ✓ Common "playground" to test and run **new cal/val methodologies, instruments, and initiatives**;
- ✓ Open to include **temporary and long-term instrumentation** and initiatives;
- ✓ **Scalable** (as far as possible) to accommodate new needs and new types of EO missions that may come in the next years;
- ✓ Building on already existing cal/val technologies AND new technologies and methods;
- ✓ Able to support the ever growing European and international EO industrial ecosystem;
- ✓ **Multi-Agency joint effort**;
- ✓ Synergetic approach not to duplicate efforts (and budgets).

- ❖ The "Cal/Val Park" concept is under **definition phase**. Phase-1 starting in Q1 2023.
- ❖ Discussions are on-going for a **joint ESA-ASI effort** (interest from other space agencies and institutions to be investigated).





Cal/Val Park (2/2)



Phase-1 Kick-Off hold in February 2023

1st Cal/Val Park User Consultation Workshop on 2nd-3rd October 2023 (online)

S2VT Agenda

12th September

- Opening Session 11:30 – 13:00
- Session #1: S2 L1 Radiometry Validation 13:00 – 13:20
- LUNCH 13:20 – 14:30
- S2 L1 Radiometry Validation 14:30 – 16:10
- COFFEE BREAK 16:10 – 16:40
- Session #2: S2 L1 Geometry Validation 16:40 – 18:00
- Ice-Breaker & Posters 18:00 – 19:00

13th September

- Session #3a: S2 L2 Validation 10:00 – 11:20
- COFFEE BREAK 11:20 – 11:50
- S2 L2 Validation 11:50 – 13:10
- LUNCH 13:10 – 14:30
- Session #3b: S2 L2 Validation 14:30 – 16:10
- COFFEE BREAK 16:10 – 16:40
- Session #4a: Downstream Products Validation 16:40 – 17:40
- Posters 17:40 – 19:00

14th September

- Session #4b: Downstream Products Validation 10:00 – 11:00
- COFFEE BREAK 11:00 – 11:30
- Downstream Products Validation 11:30 – 12:10
- Closing Session 12:10 – 13:10
- LUNCH 13:10 – 14:30

S2VT – Some Logistics

- **Lunch**: S2VT Participants will have a dedicated area in the ESA-ESRIN Canteen (right side area, before the garden)
- **Coffe Breaks**: in the **James Cook room** (turn left when exiting the meeting room)
- **Posters**: in the **James Cook room** (turn left when exiting the meeting room)
- **Ice-Breaker**: in the **Old Reception** (just in front of the meeting room)
- **Taxi**: ask at the meeting Reception
- **ESA-ESRIN bus** freely made available for the S2VT participants for the trip Frascati-ESRIN (back and forth)

Thank you for your attention

&

Enjoy the 6th S2VT Meeting