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Underlined people will be available in the live session for Q&A.

Click <u>here</u> for this session abstract Click <u>here</u> for the related Data Tailor session abstract













The Current State

- EUMETSAT's operational Earth observation <u>data catalogue</u>:
 - Spans over 35 years of meteorological satellite data, as well as climate and Copernicus marine products.
 - Adds new products 24/7/365; with consistency ensured by inter-calibration and reprocessing campaigns.
 - Offers 26% of Global Climate Observing System (GCOS) Essential Climate Variables (ECVs).
 - Is distributed to users through "push" (EUMETCAST) and "pull" (Long Term Archive/EUMETView) services.

The Challenge

- The data catalogue continues to grow:
 - Ingesting new satellite programmes and missions that increase complexity of the generated data products.
 - Making traditional workflows, where data holdings are present at user's premises, increasingly infeasible.

The Solution:

- EUMETSAT is reshaping its data services portfolio by:
 - Leveraging big data and on-premises cloud computing technologies.
 - Phasing in <u>new Data Services</u> during 2020 to facilitate near real-time data access, data visualisation, data transformation and customisation and cloud processing adjacent to the archive.



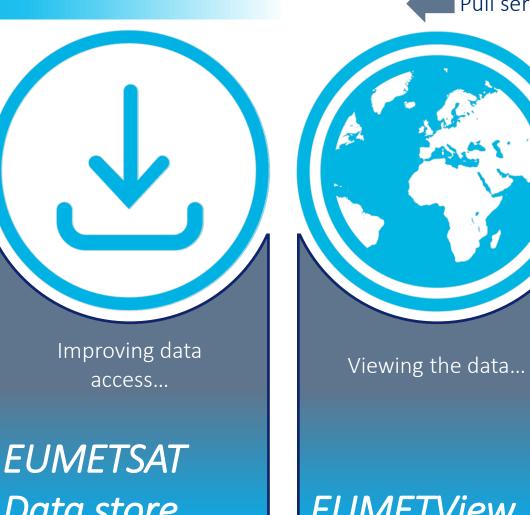


New data services for 2020



Transforming the data...

EUMETView Data Tailor Data store Further information: https://www.eumetsat.int/website/home/Data/DataDelivery/NewPilotDataServices/index.html



| Pull services | Push services |



Terrestrial

Click the icons (here and on the slide header) to navigate to each service











The **EUMETSAT Data Tailor** software makes it possible for users to subset and aggregate our data products in space and time, filter layers, generate quicklooks, project onto new coordinate reference systems, and reformat into common GIS formats (netCDF, GeoTIFF, etc.). It offers a uniform way to transform both historical and near real time satellite data provided by EUMETSAT.









EUMETSAT Data store



EUMETView



Pilot phase data collections

METOP



AVHRR RADIOMETRY PRODUCTS

IASI INTERFEROMETRY PRODUCTS

ASCAT SCATTEROMETRY PRODUCTS

GOME SPETROMETRY PRODUCTS

AMSU SOUNDING PRODUCTS

MHS SOUNDING PRODUCTS

HIRS SOUNDING PRODUCTS

MFG/MSG



MSG SEVIRI RADIOMETRY PRODUCTS

MFG MVIRI RADIOMETRY PRODUCTS

MSG CLOUD MASK PRODUCTS

<u>Downstream products:</u>



SST PRODUCTS

WIND PRODUCTS

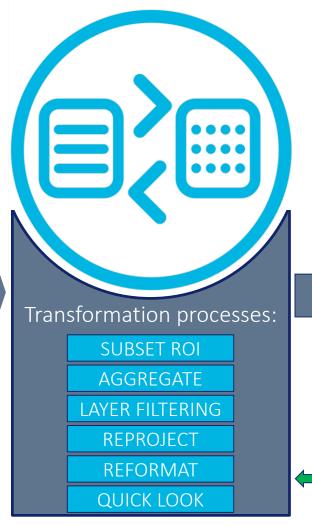
OCEAN AND SEA ICE



LST PRODUCTS

EVAPOTRANS. PRODUCTS

PAR PRODUCTS



Interfaces

Web UI interface

CLI interface

API interface

Web service interface

Planned Integrations



Apply transforms to the EUMETSAT Data Store cart



Generation of GeoTIFFs for **EUMETView**



^{*} pilot service now available







EUMETSAT Data store



EUMETView



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<u>Downstream products:</u>



SST PRODUCTS

WIND PRODUCTS

OCEAN AND SEA ICE



LST PRODUCTS

EVAPOTRANS. PRODUCTS

PAR PRODUC

Product	Platform	Format(s)	Data Layer Filter	Aggregate	ROI Extract	Reformat	Re- project	Sub- sample	Generate Quicklook
AVHRR Global Data Service L1b	Metop A, B, C	Native	X	X	Х	X	Х	X	RGB
GOME L1b	Metop A, B, C	Native	X	X	X	X	X	X	G
IASI L1c	Metop A, B, C	Native	X	X	X	X	X	X	G
ASCAT L1b	Metop A, B, C	Native	X	X	X	X	X	X	G
AMSU-A L1b	Metop A, B, C	Native	X	X	X	X	X	X	G
MHS L1b	Metop A, B, C	Native	X	X	X	X	X	X	G
HIRS L1b	Metop A, B, C	Native	X	X	X	X	X	X	G
Polar Multi Sensor Aerosol Optical Properties	Metop A, B, C	Native	X	X	X	X	X	X	G
IASI L2 Sounding Products	Metop A, B, C	Native	X	X	X	X	X	X	G
ASCAT Soil Moisture 12.5km & 25km (Native)	Metop A, B, C	Native	X	X	X	X	X	X	G
MSG L1.5 SEVIRI	0 deg., IODC, RSS	Native, HRIT	Х	X	Х	Х	Х	Х	Х
MSG L2 Cloud Mask	0 deg., IODC, RSS	HRIT, GRIB2			Х	Х	Х	Х	Х
MSG L2 Optimal Cloud Analysis	0 deg., IODC, RSS	GRIB2			X	X	X	X	Χ
MSG L2 Multi-Sensor Precipitation Estimate	0 deg., IODC, RSS	GRIB2			X	X	X	X	X
MSG L2 Active Fire Monitoring	0 deg., IODC, RSS	GRIB2			X	X	X	X	Χ
MSG L2 Cloud Analysis	0 deg., IODC, RSS	BUFR			X	X	X	X	X
MSG L2 Atmospheric Motion Vectors	0 deg., IODC, RSS	BUFR			Χ	Χ	Χ	Χ	X
Global L3C AVHRR SST	Metop B	netCDF, GRIB2	Х	Х	Х	Х	Х	Х	
ASCAT L2 Coastal Winds 12.5 km	Metop A, B	netCDF	X	X	X	X	X	X	
ASCAT L2 25 km winds record rel. 1	Metop A	netCDF, BUFR	X	X	X	X	X	X	
ASCAT L2 12.5 km winds record rel. 1	Metop A	netCDF, BUFR							
ERS L2 25 km winds record rel. 1	ERS-1, ERS-2	netCDF, BUFR	Х	X	X	X	X	X	
SeaWinds L2 25 km winds record rel. 1	QuikSCAT	netCDF, BUFR							
10-day composites of MSG Land Surface	0 deg.	HDF5			Х	×	Х	Х	X
Temperature	o deg.	ר וטו ז			^	^	^	^	^
Evapotranspiration	0 deg.	HDF5			Х	X	X	Х	Х
Reference Evapotranspiration	0 deg.	HDF5			X	X	X	Х	X
Daily Fraction of Absorbed PAR	0 deg.	HDF5			Х	Х	Х	Х	X









EUMETView



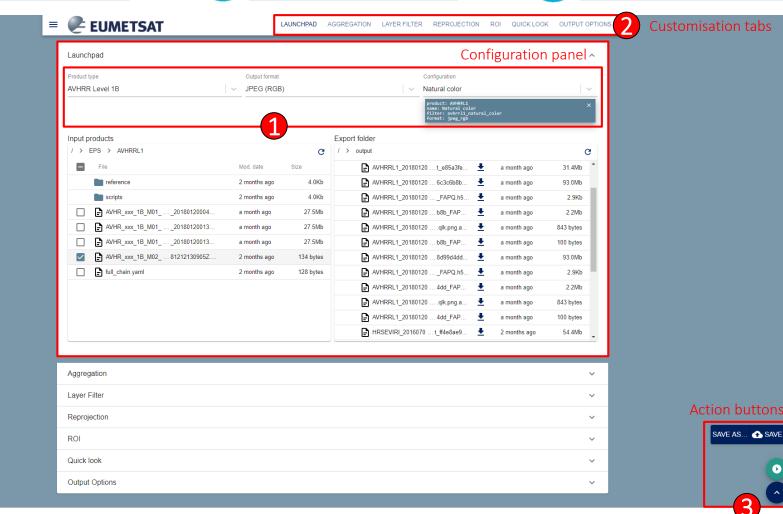
Using the WebUI

Access to the Data Tailor, and further information on its installation and use, including "how to" videos can be found through this <u>link</u>.

Drop down menus allow users to select input product type, output format type, or to load an existing configuration.

Supported output formats Binary Universal Form for the Representation of **BUFR** Meteorological Data GeoTIFF Geospatial Tagged Image File Format HDF4/HDF5 Hierarchical Data Format – version 4/5 **JPEG** Joint Photographic Experts Group netCDF-4 Network Common Data Form PNG Portable Network Graphics In-memory xarray library object of a netCDF file xarray Dataset The format of valid input data Source format

- Customisation tabs allow users to access and configure their method
- Action buttons allow users to save configurations for later use, run the process and open the monitoring panel.









EUMETSAT Data store



EUMETView

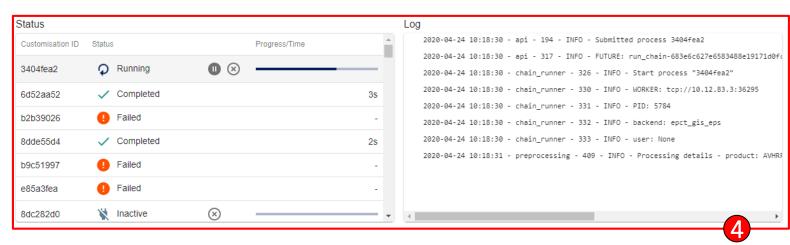


Using the WebUI (cont.)

Monitoring panel shows job queue and the current progress and the log for each run

The Data Tailor (v2.4) can be installed on:

- Linux Ubuntu 18.04 LTS 64 bit
- CentOS Linux 6 and 7 64 bit
- RedHat Enterprise Linux 7 64 bit
- Windows 10 (beta stage, feedback welcome)



Using the CLI and API

- The Data Tailor can also be run using a command line interface (CLI).
 - This functionality is installed by default and allows the Data Tailor to be exploited for batch processing.
 - More information on using the CLI can be found in the Data User Guide.
- In addition, the Data Tailor features a Python application programming interface (API), which
 - allows for external use to Data Tailor capability to be exploited externally
 - supports the use inclusion of the Data Tailor in more complex processing chains (e.g. with PyTroll)

The Web service

• the Web Service Interface provides a REST web interface than can be invoked from other applications







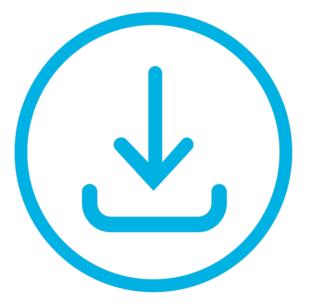








The **EUMETSAT Data Store** provides users with a download and <u>linked data tailoring service</u> for online data; providing access through an online interface and via Application Programming Interface (API).











EUMETView



Pilot phase data collections

METOP



AVHRR RADIOMETRY PRODUCTS

IASI INTERFEROMETRY PRODUCTS

ASCAT SCATTEROMETRY PRODUCTS

MFG/MSG



MSG SEVIRI RADIOMETRY PRODUCTS

MFG MVIRI RADIOMETRY PRODUCTS

MSG CLOUD MASK PRODUCTS

Downstream products:



SST PRODUCTS

Planned future data collections

Sentinel-3A / 3B products

Further Satellite Application Facility products

....the full EUMETSAT product catalogue!







Interfaces

Online web interface

I Download API

2 OpenSearch API

REST API

4 Subscription API

Planned Integrations



Product customisation through the Data Tailor



Product viewing through EUMETView









EUMETView



Pilot phase data collections

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Downstream products:



SST PRODUCTS

Product	Platform	Format (s)	Historic	NRT*	CDR**
AVHRR Global Data Service L1b	Metop A, B, C	Native	2019	2020	
IASI Global Data Service L1c	Metop A, B, C	Native & PDU	2019	2020	
IASI Combined Sounding Products	Metop A, B, C	Native	2019	2020	
ASCAT Soil Moisture at 12.5 km	Metop A, B, C	Native	2019	2020	
ASCAT Soil Moisture at 25 km	Metop A, B, C	Native	2019	2020	
MSG L1.5 SEVIRI Image Data	0 deg., IODC, RSS	Native	2019	2020	
MFG L1.5 MVIRI CDR	0 deg., 57 deg., 63 deg.	netCDF			63 years
MSG L2 Cloud Mask	0 deg., IODC, RSS	GRIB2	2019	2020	

Global AVHRR SST	Metop B	netCDF	2019	2020	
ASCAT L2 Coastal Winds at 12.5 km	Metop A, B	netCDF	2019	2020	
ASCAT L2 25 km winds record rel. 1	Metop A	netCDF			7 years
ASCAT L2 12.5 km winds record rel. 1	Metop A	netCDF			7 years

The Data Store will provide access to historic and near real-time (NRT*) data, as well as climate data records (CDRs**).

The pilot data streams are only the beginning. Much more is coming in the near future!









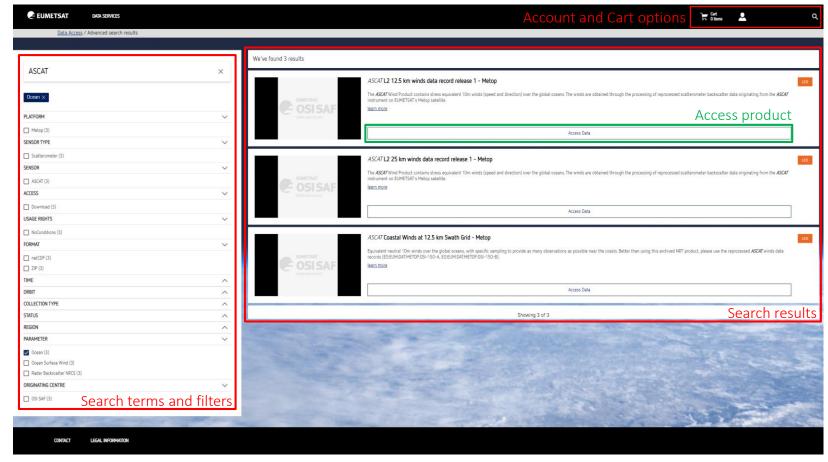




Interfaces

Online interface

Web UI based catalogue navigation











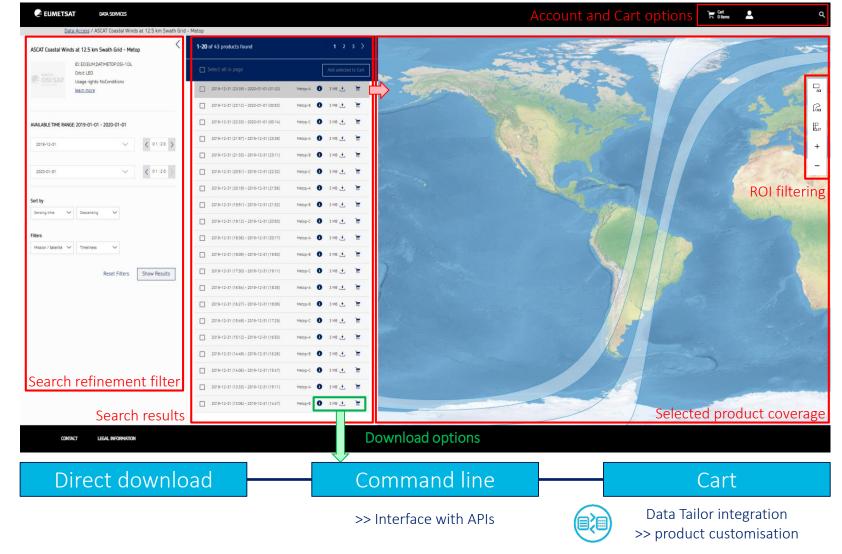




Interfaces

Online interface

Web UI based catalogue navigation











EUMETView



Interfaces

Online interface

Download API
OpenSearch API
REST API
Subscription API

Download data using URL, command line and Python based options using ID or collection and sensing time

Search Data Store at product and collection levels. Filter selections by time, ROI, satellite, timeliness

Navigate/Browse products and collections by date and spatial coverage / footprint

Notification service for new product availability







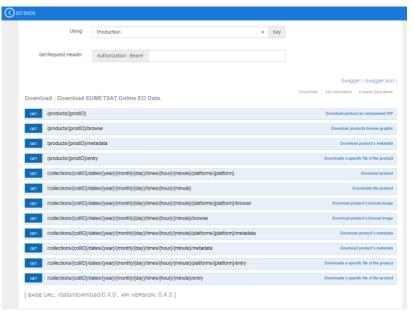




Interfaces

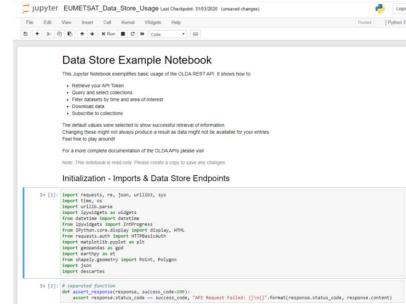
Online interface

Download API
OpenSearch API
REST API
Subscription API











Python and Jupyter notebook examples snippets available for each API





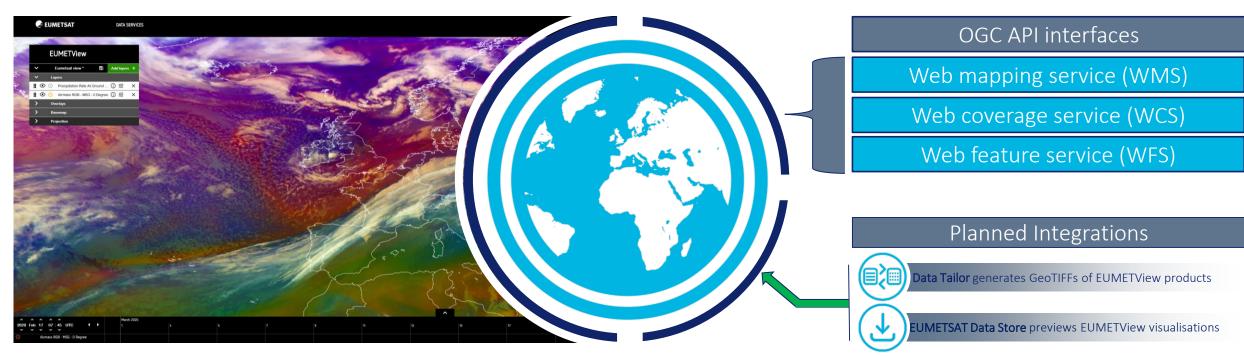








EUMETView is an Online Map Service that provides visualisations of EUMETSAT products through a customisable web user interface and an enhanced set of Open Geospatial Consortium (OGC) standard APIs. EUMETView makes it is possible to create and save maps using the user interface, or integrates with user's personal service, via the API.



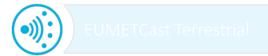








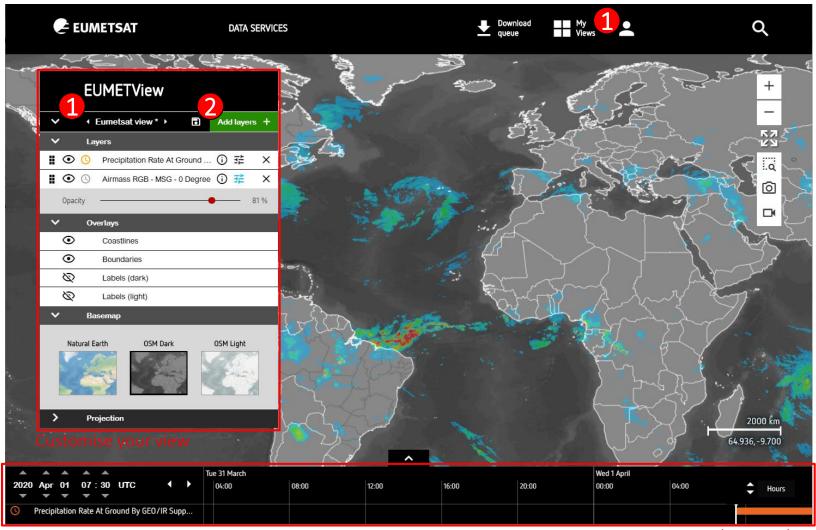




The EUMETView web interface

- > Customisable data viewing
- New: My Views functionality to customise and save maps. EUMETSAT visualisations tailored to users' needs.
- 2 Search and add data layers by satellite/theme





View your data timeline

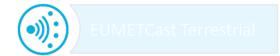








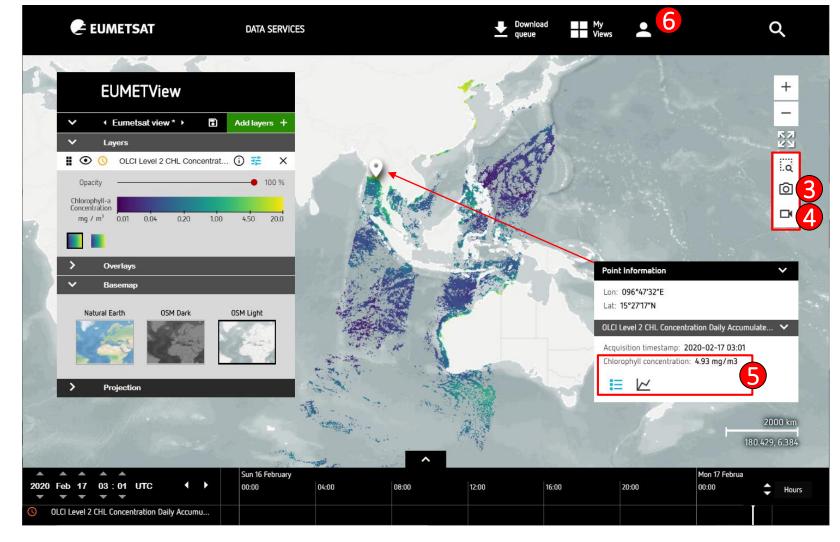




The EUMETView web interface

- > Customisable map download
- Create snapshots of the displayed maps or download the georeferenced products.
- 4 Animate and download maps
- View data as point value information or time series
- Account-based data policy for licensed visualisations

The new EUMETView will run in parallel with the existing service during the pilot phase (Q4 2020)







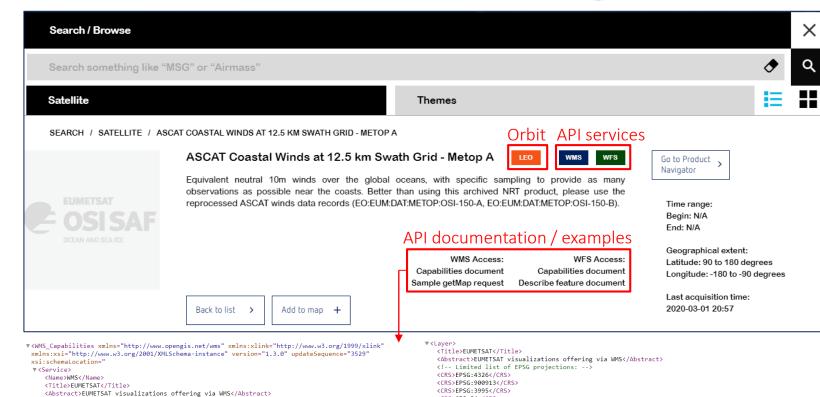






OGC API interfaces

- Each product has its available API services listed
- API access determined by user specific license.
- Full API capability documents provided
- Example OGC requests provided
- This will allow the users to be able to integrate EUMETView in their own applications and to be able to perform systematic images and products download without accessing the GUI







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<AccessConstraints>none</AccessConstraints>

▶ <GetCapabilities>...</GetCapabilities>

▶ <GetFeatureInfo>...</GetFeatureInfo>

</Service>

▼ <Capability>
▼ <Request>

</Request>

▶ <GetMap>...</GetMap>

▶ <Exception>...</Exception>



OGC Service









Platform

Pilot phase data collections

METOP



AVHRR RADIOMETRY PRODUCTS

MFG/MSG



MSG SEVIRI RADIOMETRY PRODUCTS MSG CLOUD MASK PRODUCTS

Downstream products:



SST PRODUCTS

WIND PRODUCTS

SENTINEL-3A / 3B



SLSTR RADIOMETRY PRODUCTS OLCI RADIOMETRY PRODUCTS



Metop AVHRR RGB Clouds (accumulated orbits)	Metop A, B, C	WMS
Metop AVHRR Natural Colour + Fog (accumulated orbits)	Metop A, B, C	WMS
Metop AVHRR IR 10.8	Metop A, B, C	WMS
Metop AVHRR Orbital Footprints	Metop A, B, C	WMS, WFS
Meteosat single channel imagery (10.8, 3.9, 0.6, 6.2)	0 deg., IODC, RSS	WMS
RGB Day Microphysics; Ash; Dust; E-View, Fog, Convection, Natural Colour, Snow, Nat. Colour Enhanced, Tropical Airmass.	0 deg., IODC, RSS	WMS
Cloud products CTH, CLAI, CLM, GII	0 deg, IODC	WMS
Fire	0 deg., IODC, RSS	WMS
Precipitation (H03B)	0 deg.	WMS, WCS
Precipitation (MPE)	IODC	WMS, WCS
AMV	0 deg., IODC	WMS, WFS
Global AVHRR SST	Metop B	WMS, WCS
ASCAT L2 Coastal Winds at 12.5 km	Metop A, B	WMS, WFS
Sentinel 3 OLCI L1 RGB orbits	Sentinel 3A & B	WMS
Sentinel 3 OLCL L2 CHL Concentration orbits	Sentinel 3A & B	WMS
Sentinel 3 SLSTR L2 SST orbits	Sentinel 3A & B	WMS
Sentinel 3 OLCI L1 RGB accumulated orbits over a day orbits	Sentinel 3A & B	WMS
Sentinel 3 OLCL L2 CHL Concentration accumulated orbits / day	Sentinel 3A & B	WMS
Sentinel 3 SLSTR L2 SST accumulated orbits / day	Sentinel 3A & B	WMS



Product









EUMETView



EUMETCast is EUMETSAT's primary "push" mechanism for the near real-time delivery of satellite data and products, delivering a wide range of products through a multi-service dissemination system based on multicast technology. The **EUMETCast Terrestrial** service augments the existing EUMETCast Satellite service, using the terrestrial National Research and Education Network (NREN) and GÉANT infrastructure as a delivery mechanism.











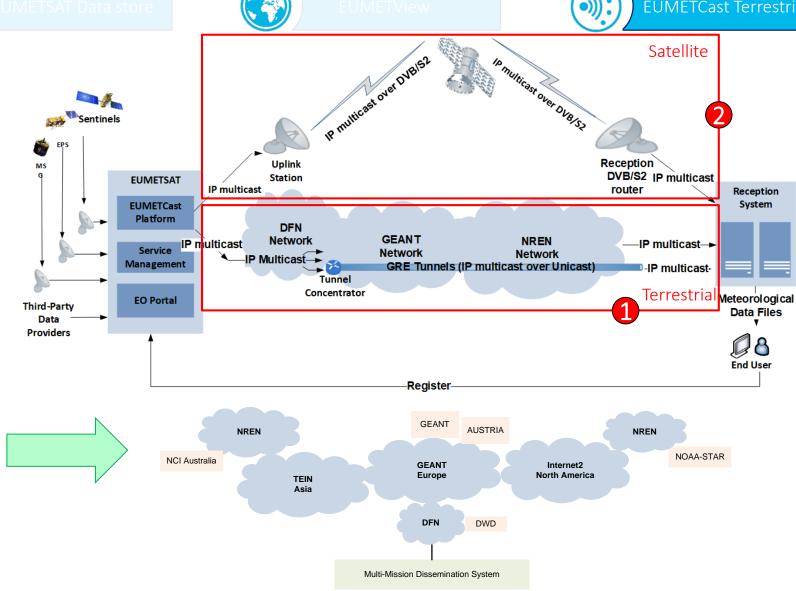


EUMETCast Terrestrial

EUMETCast Terrestrial

- FUMFTCast Terrestrial services have been developed to be similar and consistent with its **EUMETCast Satellite counterpart.**
- All services provide a harmonised interface to the end-user, irrespectively of the EUMETCast service of choice.
- All services can be subscribed using one single interface (EO Portal) and the same EUMETCast Reception Station can be used for both Satellite and Terrestrial services.
- Data is distributed using National Research and Education Networks (NRENs).
- The NRENS use the GEANT worldwide network architecture as sole network service provider and interface point.

EUMETCast Satellite will remain the backbone service for safety critical applications of our data, complemented by EUMETCast Terrestrial and the EUMETSAT Data Store in line with a "multichannel" data services strategy









EUMETSAT Data store

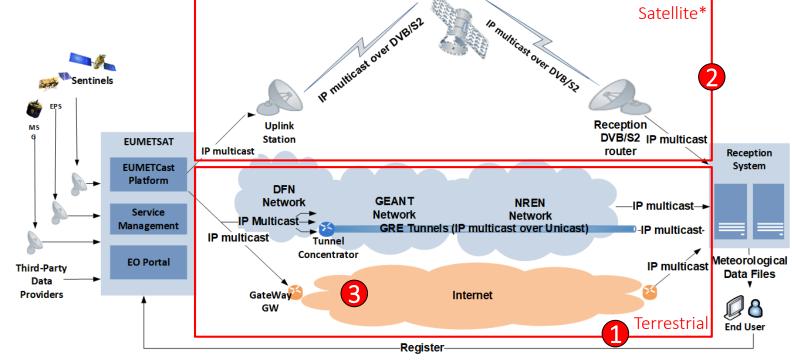
EUMETView



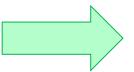
EUMETCast Terrestrial

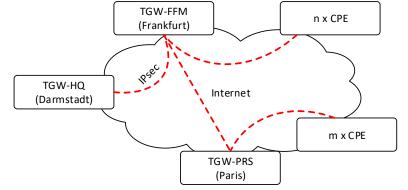
EUMETCast Terrestrial

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Future augmentation of EUMETCast Terrestrial with an Internet based service are currently in the pilot phase.

















EUMETSAT is offering an array of new data services

- These will support an increased ability to receive, access, view and transform satellite data
- They will provide access to the full EUMETSAT product catalogue, including near real-time data, historic products and climate data records.
- Pilot phases are expected begin in Q3 2020. The Data Tailor is available for use now!

More information

- For more information on the data services, please follow this <u>link</u>.
- More user support resources will be available soon! Please follow <u>@eumetsat</u> and <u>@eumetsat</u> users on Twitter for up to date news, or contact our helpdesk via <u>ops@eumetsat.int</u>.

