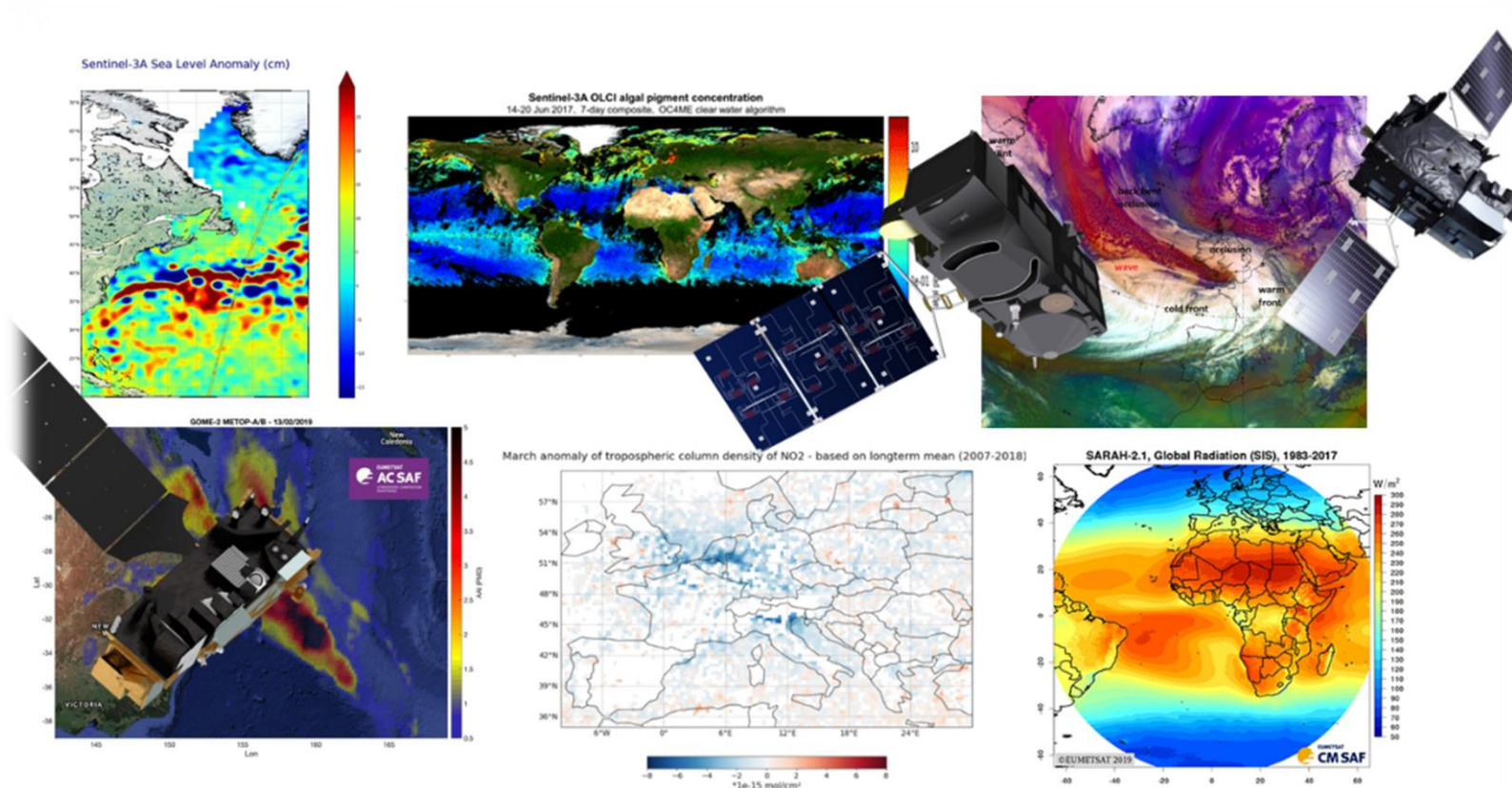


# Welcome to the 12<sup>th</sup> short online course in the series

## The session will begin at 12 UTC



Copernicus  
Europe's eyes on Earth



EUMETSAT  
AC SAF  
ATMOSPHERIC COMPOSITION

EUMETSAT  
CM SAF  
CLIMATE MONITORING

If you have technical issues, please send a message in the chat box to **Support**.  
For **Q&A**: go to Slido.com – event code: **#EUMSC12**

# Upcoming Short Courses

- **24 March 2021, 12:00 UTC - How to build a case study – a demo session FOLLOW-UP**  
with Ivan Smiljanic and Natasa Strelec Mahovic
- **14 April 2021, 12:00 UTC - The Temperature of the Sea**, with Lauren Biermann and Christine Träger-Chatterjee
- **12 May 2021, 12:00 UTC - Spot atmospheric convection from satellite**, with Natasa Strelec Mahovic and Ivan Smiljanic
- More to come ...

<https://training.eumetsat.int/>  
→ Events → Short Courses

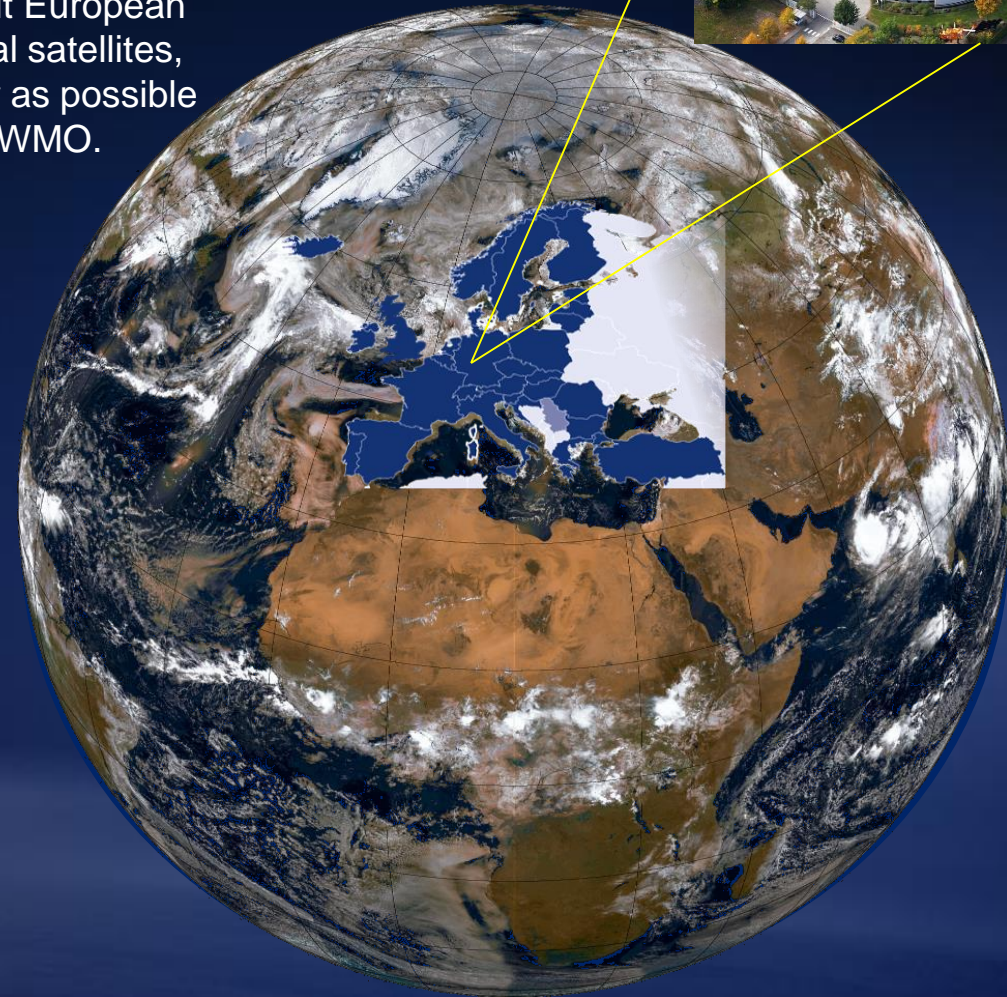
# EUMETSAT is an intergovernmental Organization

## Member States



## Tasks

- Develop, maintain, exploit European systems of meteorological satellites, taking into account as far as possible the recommendations of WMO.
- Contribute to operational climate monitoring and the detection of global climatic changes.



# Current EUMETSAT Satellites

## METOP-A, -B, & -C

LOW EARTH, SUN-SYNCHRONOUS ORBIT

EUMETSAT POLAR SYSTEM (EPS)

## SENTINEL-3 A & B

LOW EARTH, SUN-SYNCHRONOUS ORBIT

COPERNICUS SENTINEL-3 MARINE MISSION

## JASON-2 & -3, Sentinel-6

LOW EARTH, NON-SYNCHRONOUS ORBIT

OCEAN SURFACE TOPOGRAPHY MISSION,  
SHARED WITH CNES/NOAA/EU



## METEOSAT-8

GEOSTATIONARY ORBIT

METEOSAT 2<sup>ND</sup> GENERATION  
IODC SERVICE  
UNTILL AT LEAST MID-2020

## METEOSAT-9, -10, -11

## METEOSAT Third Generation (MTG), launch 2022

GEOSTATIONARY ORBIT

TWO-SATELLITE SYSTEM

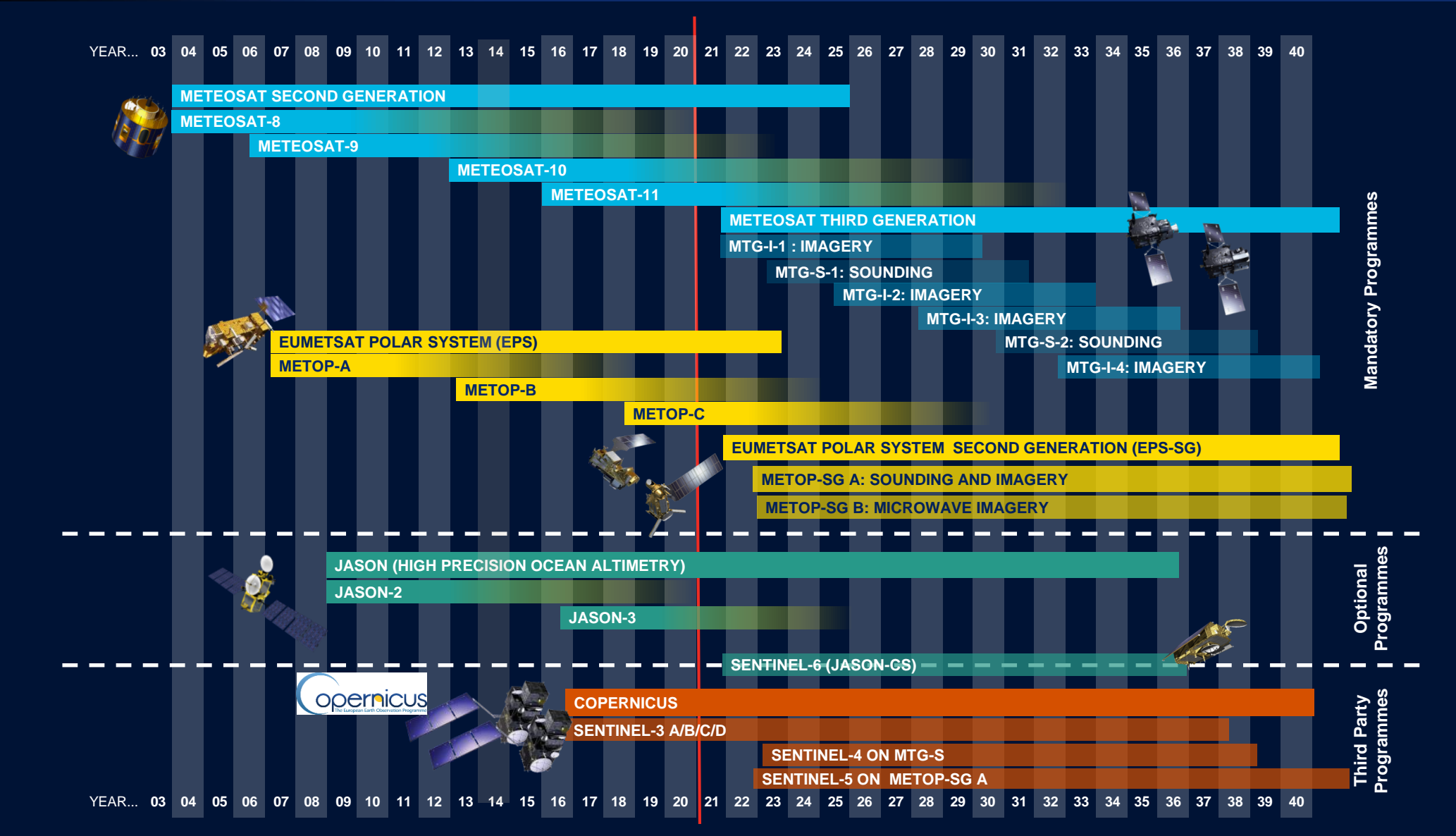
METEOSAT 2<sup>ND</sup> GENERATION

FULL DISC IMAGERY SERVICE (15 MINS): METEOSAT-11 (0°)

RAPID SCAN SERVICE OVER EUROPE (5 MINS): METEOSAT-10 (9.5° E)

HOT BACK UP TO BOTH SERVICES : METEOSAT-9 (3.5° E)

# EUMETSAT committed to more & better observations until 2040



# Course Program

12:00 UTC

Welcome and Introduction

12:05 UTC

How to build a case study

12:45 UTC

Q&A and Wrap Up

Wed, 24 March, 12:00 UTC

Follow-up session

**Discussion Q&A on:** [slido.com #EUMSC12](https://www.slido.com/join/default.htm?event=EUMSC12)

**Course Material:** <https://training.eumetsat.int/course/view.php?id=397>

If you have technical issues, please send a message in the chat box to **Support**.

For **Q&A**: go to Slido.com – event code: **#EUMSC12**

# EUMETSAT Short Courses: *How to build a case study?*

17 March 2021

Natasa Strelec Mahovic and Ivan Smiljanic,  
EUMETSAT



# Important questions

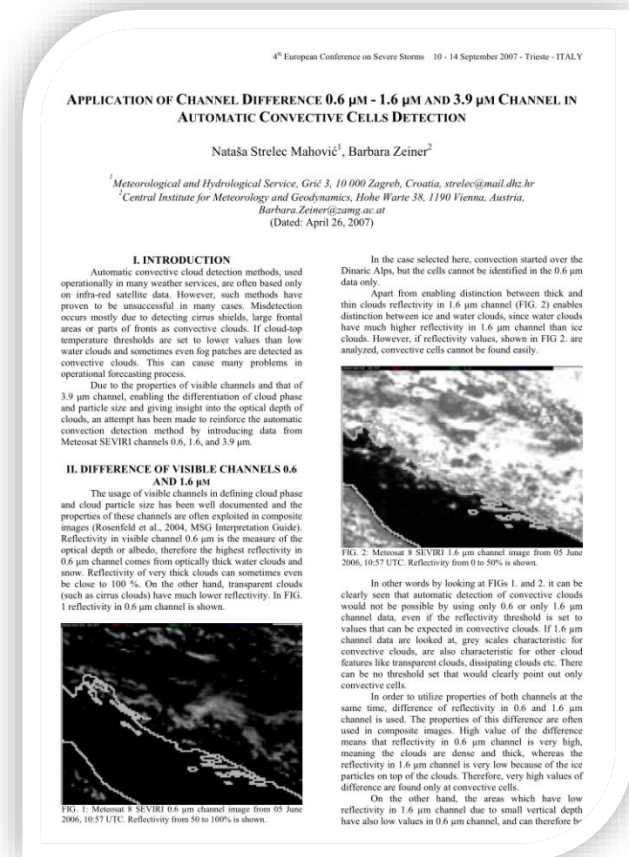
- What is a case study (CS)?
- What is it good for?
- Who does CSs?
- ...
- ...
- ...
- **How to do it?**



# What is a case study?

# What is a case study

< Anything from a Twitter post to a scientific paper >

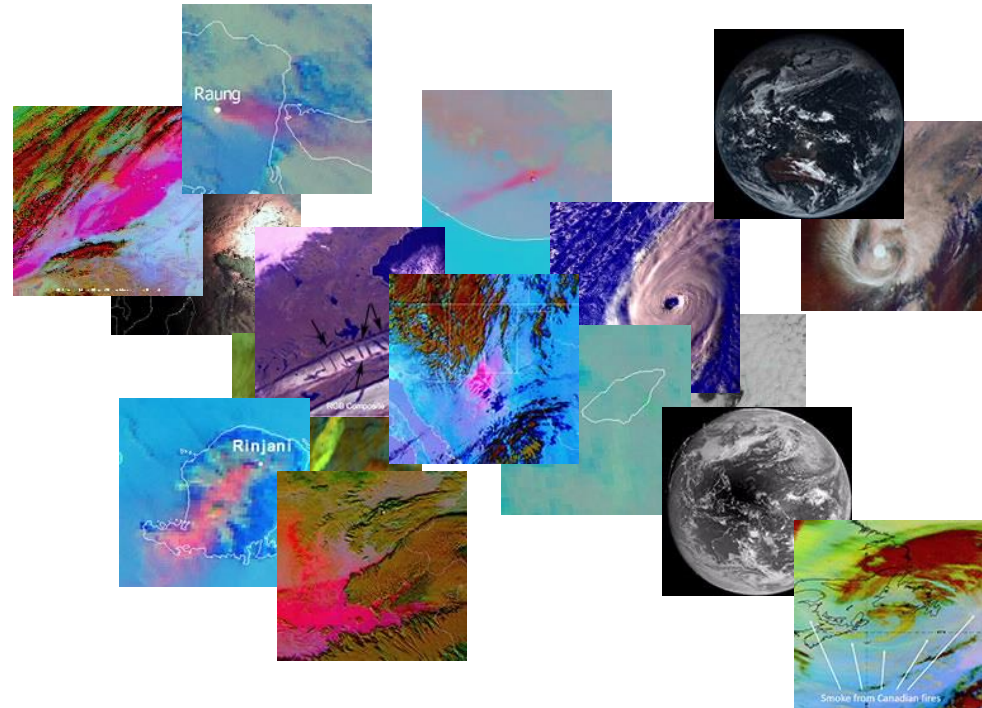


# What is a case study

- “A **case study** involves an *up-close, in-depth, and detailed examination* of a particular case or cases, within a *real-world context*.” – Wikipedia
- Or - a case-based story telling (scientific research) about different:
  - Conceptual models in Earth-Atmosphere system
  - Satellite system capabilities
  - Data and product utility
  - Particular weather event of high impact/interest
  - Climate (change) description
  - ...

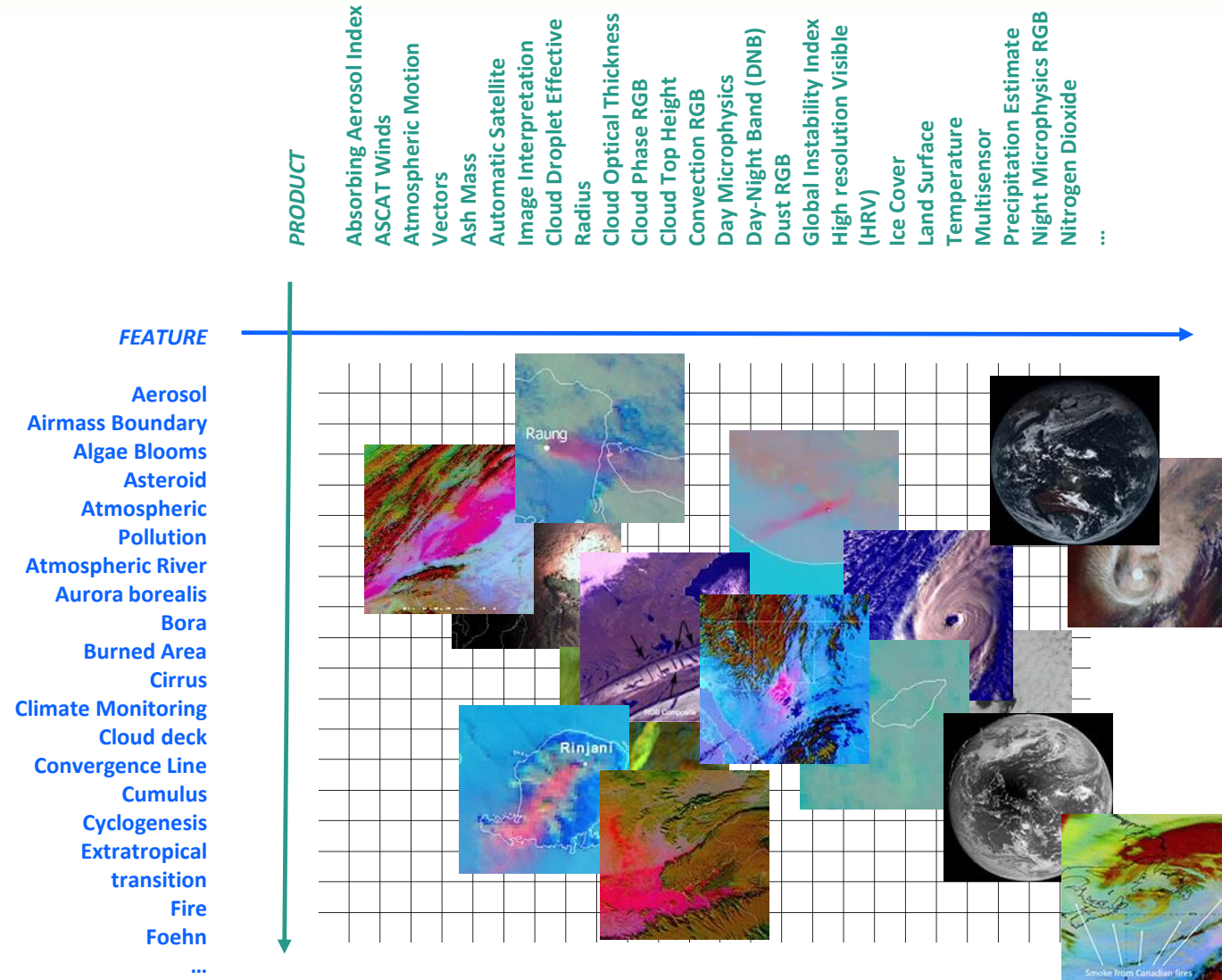
# What is a case study

- EUMETSAT  
Case Study  
Library



# What is a case study

- EUMETSAT Case Study Library



# What is a case study

- EUMETSAT Case Study Library

Case studies

Imagery and case studies of weather phenomena and environmental events observed by EUMETSAT a fleet of weather satellites.

Filter by

1373 results

Start Date: Descending

19 FEBRUARY 2021 12:00-22:00 UTC  
Arctic blast turned US white  
Band of ice from freezing rain over Texas clearly seen in RGB imagery on 19 Feb 2021.

15 FEBRUARY 2021 07:00 UTC-19 FEBRUARY 08:00 UTC  
Large dust plume ejecting off west Africa  
Saharan dust heading for Europe in Feb 2021: second major dust outbreak of the season

15 FEBRUARY 2021 00:00 UTC-16 FEBRUARY 09:00 UTC  
End of the cold spell in western Europe, arrival of cold air in south-eastern Europe  
Cold spell in Germany ended with freezing rain on 15 February. Snowstorm hit Greece and western Turkey.

5 FEBRUARY 2021 09:00 UTC-7 FEBRUARY 11:00 UTC  
Meteosat-11 captures plume of Saharan dust coming from northern Africa  
On 5-6 February 2021, a massive amount of Saharan dust was advected across the Mediterranean Sea into central Europe.

MAY, JUNE, DECEMBER 2020 AND JANUARY 2021  
Contrails - when do we see them from satellites?  
Looking at the contrails in satellite images and investigating supportive atmospheric conditions.

1-15 FEBRUARY 2021  
February 2021: very cold first half in Europe and North America  
Winter 2020/21 brings arctic weather conditions to northern & central Europe.

27 JANUARY 11:00 UTC-28 JANUARY 10:00 UTC  
Series of storms over parts of

26 JANUARY 2021 00:00 UTC-29 JANUARY 10:00 UTC  
Storm Justine hits the Azores

18 JANUARY 2021 21:00 UTC-21 JANUARY 09:00 UTC  
Storm Christoph batters th

> <https://www.eumetsat.int/case-studies>

# What is a case study

- EUMETSAT Case Study Library

The screenshot shows the EUMETSAT Case Studies website. At the top, there is a header with the text "Case studies" and a sub-header "Imagery and case studies of weather phenomena and environmental events observed by EUMETSAT's fleet of weather satellites." Below the header is a "Filter by" section with a dropdown arrow. Underneath, it says "1373 results" and "Start Date: Descending" with a dropdown arrow and a grid icon. The main content area displays a grid of case study cards. Each card includes a date range, a title, a short description, and a small satellite image. Visible titles include "Arctic blast turned US white", "Large dust plume ejecting off west Africa", "End of the cold spell in western Europe, arrival of cold air in south-eastern Europe", "Meteosat-11 captures plume of Saharan dust coming from northern Africa", "Contrails - when do we see them from satellites?", "February 2021: very cold first half in Europe and North America", "Series of storms over parts of", "Storm Justine hits the Azores", and "Storm Christoph batters th".

Check examples here



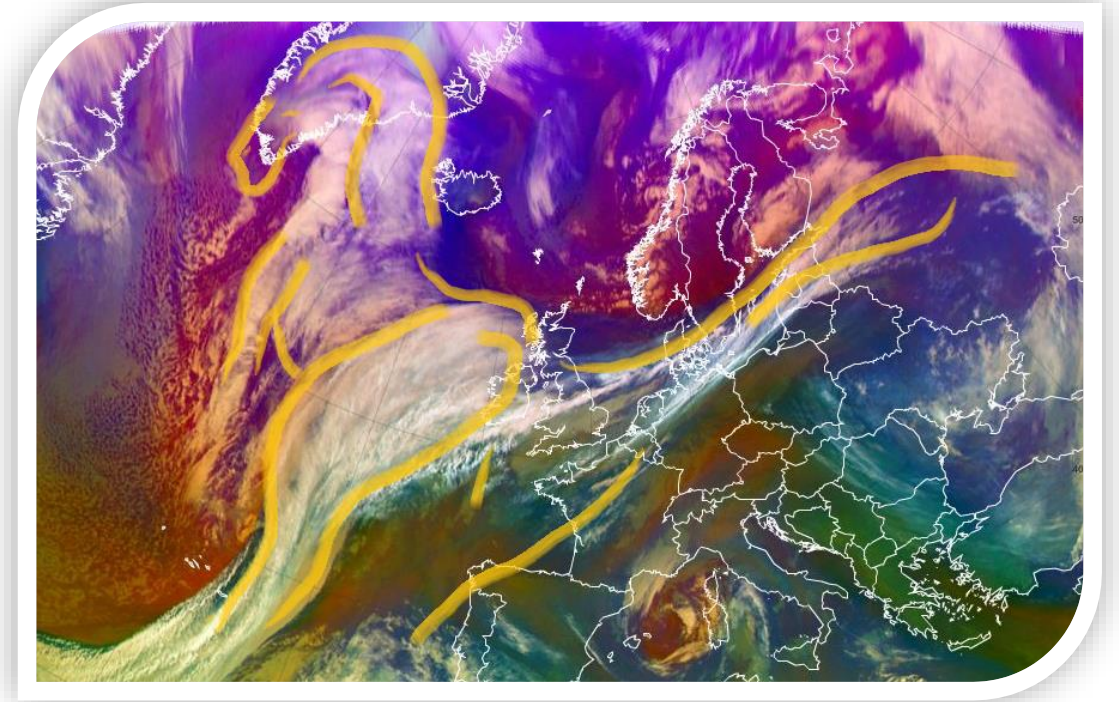
> <https://www.eumetsat.int/case-studies>

# What is a CS good for?



# What is a case study good for

- Multiple (hidden) reasons:
  - handling data
  - defining/tuning tools
  - revealing physics
  - defining advantages and constrains
  - comparing instruments
  - redefining needs
  - develop 'feeling' for data
  - expand knowledge
  - inventing
  - networking
  - user training
  - ...
  - have fun



# Who does the CSs?

# Who does the CSs

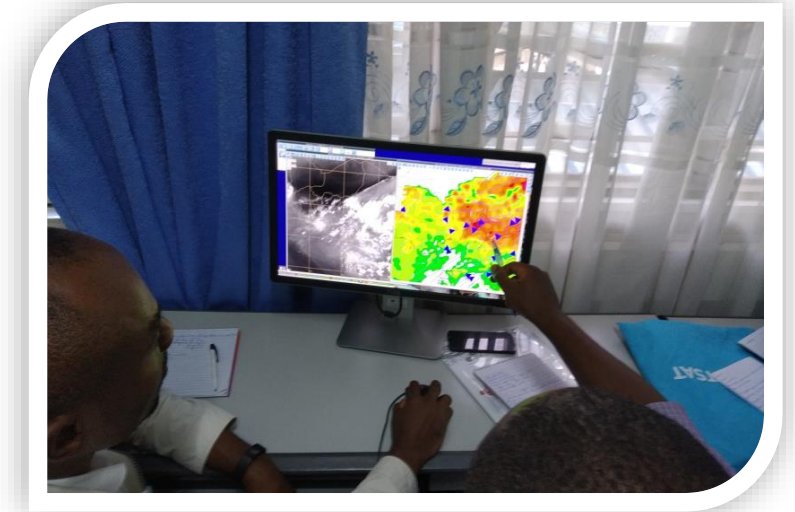
You



# How do we make the CSs?

# How do we make the CSs

1. Idea
2. Data exploration
3. Expert collaboration
4. Revision
5. Web publication



# How do we make the CSs – data, tools, resources

- Where do we get data and how ?
- Which tools we can use for visualisation?
- Training resources: Satmanu, Quick Guides, Cheat-sheets, Colour interpretation guides
- Which expert group to consult ?
- Info sources: WMO Saturn and Oscar ...

# Getting the data – images

<https://view.eumetsat.int>

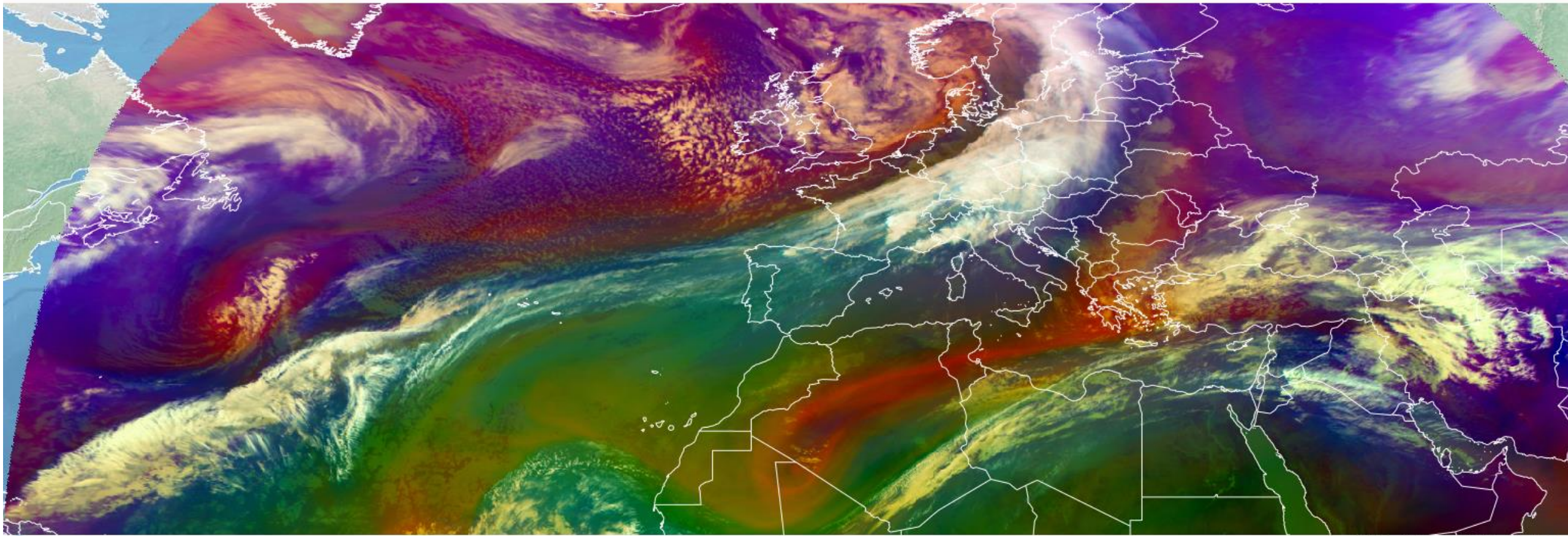
The screenshot displays the EUMETSAT Data Services interface. At the top left, the logo and text 'EUMETSAT DATA SERVICES' are visible. On the right side of the top navigation bar, there are icons for 'API access', 'Download queue', 'My Views', and a user profile 'strelec'. The main area shows a satellite image of Europe with a color scale from purple to red. A 'Map data download' dialog box is open on the right, containing the following options:

- Current map view: [dropdown]
- Mode: [dropdown]
- Size: 1536 x 666 [link icon]
- Format: PNG [dropdown]
- Include base layer
- Add footer
- Download [arrow icon]

On the left, a 'EUMETView' sidebar shows a list of layers, with 'Airmass RGB - MSG - 0 degree' selected. The bottom of the interface features a timeline for 'March 2021' with a date range from 26 to 21, and a 'Days' dropdown. A scale bar in the bottom right indicates 1000 km and coordinates 3.971, 35.850.

# Getting the data – images

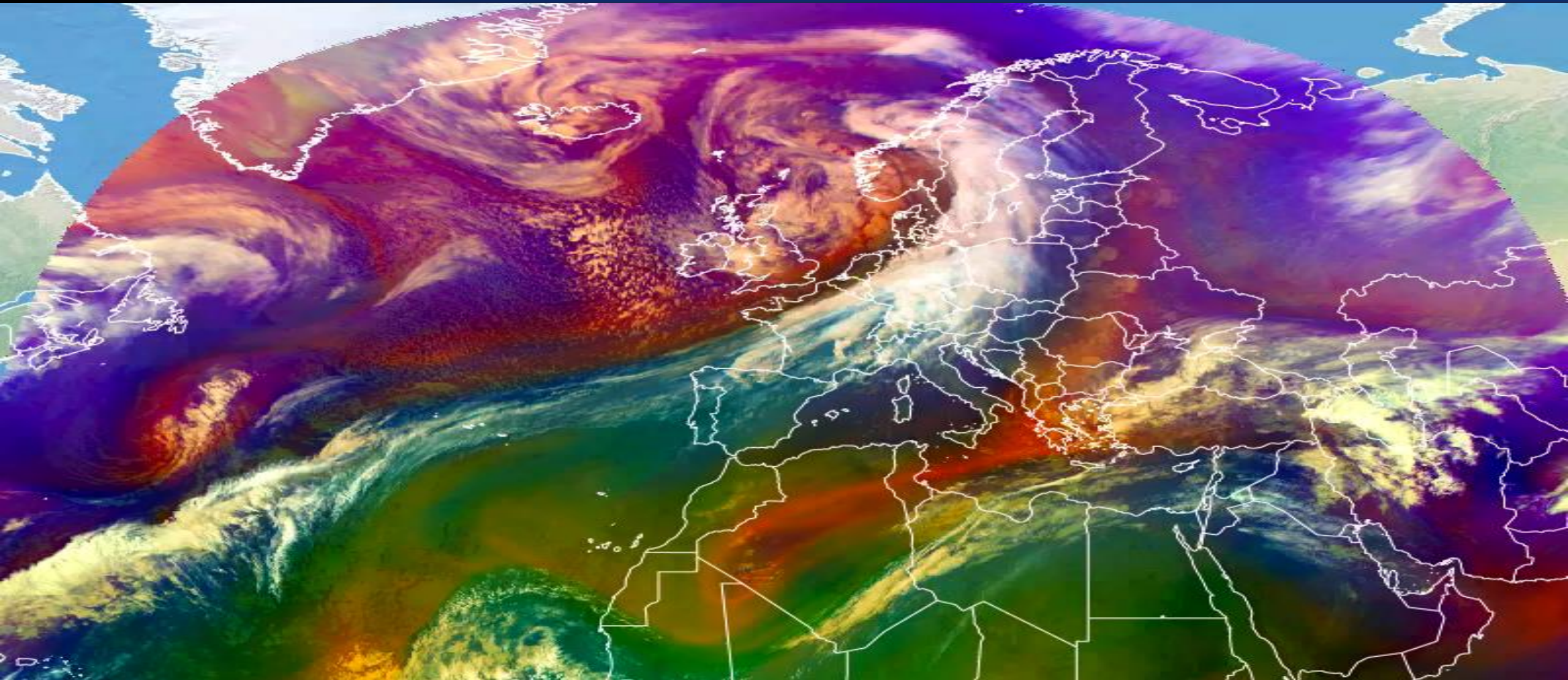
<https://view.eumetsat.int>





# Getting the data – images

<https://view.eumetsat.int>



# Getting the data – images

<https://view.eumetsat.int>

## Current data collections

### METOP



AVHRR RADIOMETRY PRODUCTS



SST PRODUCTS

WIND PRODUCTS

### MFG/MSG



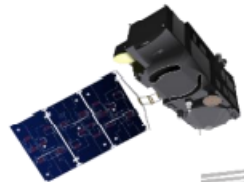
MSG SEVIRI RADIOMETRY PRODUCTS

MSG CLOUD MASK PRODUCTS



PRECIP. PRODUCTS

### SENTINEL-3A / 3B



SLSTR RADIOMETRY PRODUCTS

OLCI RADIOMETRY PRODUCTS



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



The screenshot displays the NASA WorldView web application interface. On the left, a sidebar contains a 'Layers' panel with 'OVERLAYS' and 'BASE LAYERS' sections. The 'OVERLAYS' section lists several satellite tracks (Suomi-NPP, Terra, Aqua) and other data layers like Snow Cover, Place Labels, Coastlines, and Roads. The 'BASE LAYERS' section includes a '+ Add Layers' button. The main area features a search bar and a grid of category-based data layer options. The categories include: Hazards And Disasters, Air Quality, Ash Plumes, Drought, Dust Storms, Fires, Floods, Severe Storms, and Shipping. Each category has a list of specific data layers and a representative image. For example, the 'Fires' category includes 'Fires - Carbon Monoxide'. The background shows a satellite map of the Middle East region, with a timeline at the bottom indicating the date '2015 NOV 11' and navigation controls for time and zoom.



## Custom Visualization

Satellite imagery in EO Browser can be visualized based on user's desired configuration. There are already several visualizations with legends and descriptions prepared for you, such as true color, false color, NDVI, EVI, etc.

A screenshot of the EO Browser web application interface. On the left, a sidebar menu lists several visualization options: "False color" (Based on bands 8, 4, 3), "NDVI" (Based on combination of bands (B8 - B4)/(B8 + B4)), "False color (urban)" (Based on bands 12, 11, 4), and "Moisture index" (Based on combination of bands (B8A - B11)/(B8A + B11)). The "Moisture index" option is selected. Below the menu, a detailed legend for the "Normalized Difference Moisture Index (NDMI)" is displayed. The legend includes a color scale from blue (&gt; 0.8) to red (&lt; -0.8) and a descriptive paragraph: "The NDMI is a normalized difference moisture index, that uses NIR and SWIR bands to display moisture. The SWIR band reflects changes in both the vegetation water content and the spongy mesophyll structure in vegetation canopies, while the NIR reflectance is affected by leaf internal structure and leaf dry matter content but not by water content. The combination of the NIR with the SWIR removes variations induced by leaf internal structure and leaf dry matter content, improving the accuracy in retrieving the vegetation water content. The amount of water available in the internal leaf structure largely controls the spectral reflectance in the SWIR interval of the electromagnetic spectrum. SWIR reflectance is therefore negatively related to leaf water content." On the right side of the screenshot, a large satellite image is shown, visualized using the NDMI index, displaying a pattern of blue and yellow circular features.

2018-04-16  
22:30:42 UTC

(H)ide

Stop (space) < >

(L)oop  (R)ock  Re(v)

Speed

Zoom (+) Zoom (-) Max (Z)oom

(M)aps  Lat/Lo(n)  Slid(e)r

Mouse (D)raw  Clear Drawin(g)s

(S)atellite GOES-East (GO...  
Se(c)tor Full Disk  
(P)roduct GeoColor (CIRA)

Add (O)verlay Add (O)verlay

# of (I)mages 12  
(T)ime Step 15 min

GeoColor (CIRA) x  
 Hide

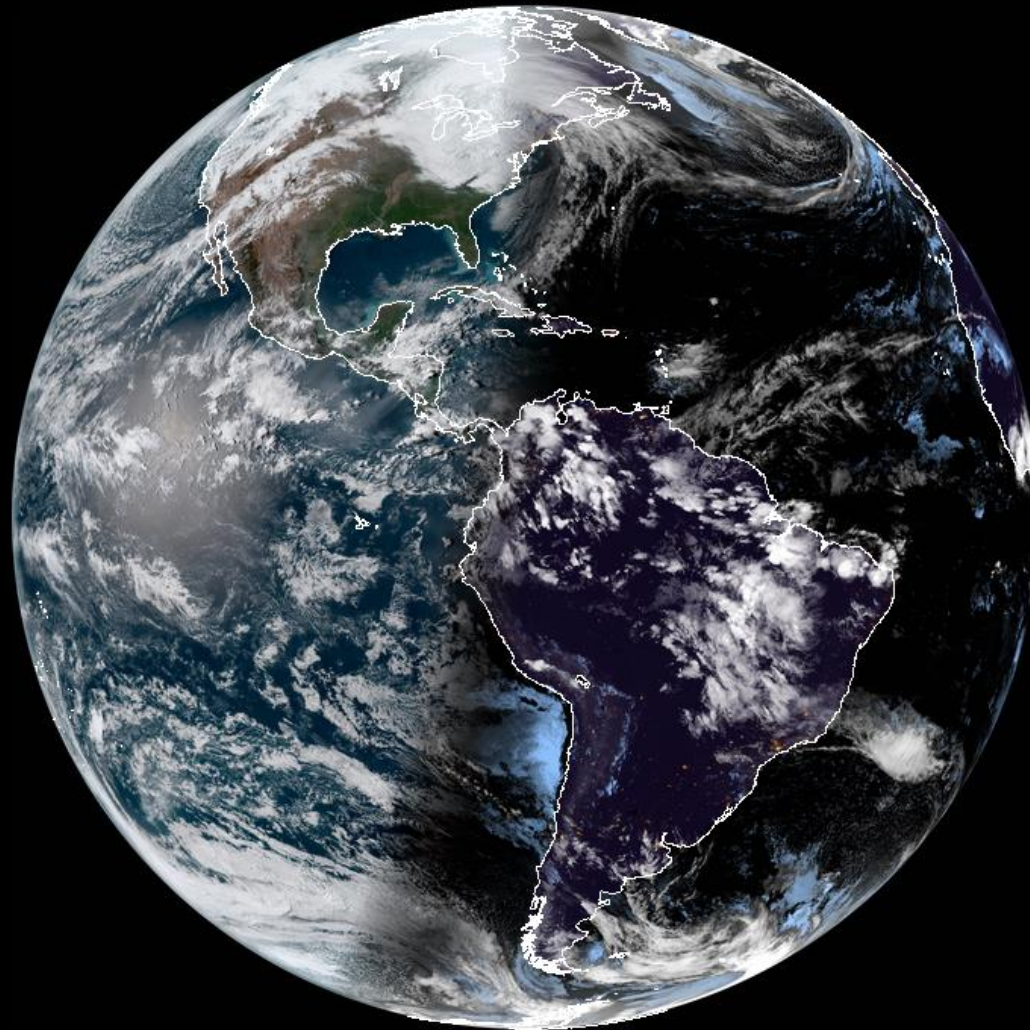
(A)rchived Imagery

(B)egin D... Be Begin Ti...  
End Date... En End Tim...

Home (y) Share (U)RL Help (?)

[SLIDER](#) by [RAMMB](#) / [CIRA](#) @ [CSU](#)  
[Experimental Products Disclaimer](#)

2018-04-16 22:30:42 UTC



# New EUMETSAT Data Services

Data Store

Data Tailor

[http://eumetrain.org/data/6/603/snow\\_ew\\_2021\\_s2c.pdf](http://eumetrain.org/data/6/603/snow_ew_2021_s2c.pdf)

Knowledge base for services

[EUMETSAT User Support - EUMETSAT Public Confluence \(atlassian.net\)](#)

# https://ladsweb.modaps.eosdis.nasa.gov/search/

The screenshot displays the LAADS DAAC search interface. At the top, the NASA logo and 'LAADS DAAC' are on the left, and navigation links for 'About LAADS', 'Find Data', 'Data Discovery', 'Quality', 'Help', and 'Profile' are on the right. A progress bar below the header shows five steps: 1. PRODUCTS (highlighted), 2. TIME, 3. LOCATION, 4. FILES, and 5. REVIEW & ORDER. Below the progress bar, status indicators show 'No products selected.', 'No date selected.', 'No location selected.', and 'No files selected.', with a 'reset' button. A search bar on the right contains the placeholder text 'keyword'. The 'Select a Sensor' dropdown menu is open, listing various sensors: AVHRR:NOAA-07, AVHRR:NOAA-09, AVHRR:NOAA-11, AVHRR:NOAA-14, AVHRR:NOAA-16, AVHRR:NOAA-18, AVHRR:NOAA-19, Multiple (Ancillary Data), MERIS:Envisat, MODIS:Aqua, MODIS:Combined-Terra-Aqua, MODIS:Terra, OLCI:ESA-Copernicus-Sentinel-3A, SLSTR:ESA-Copernicus-Sentinel-3A, VIIRS:Suomi-NPP, and All Sensors. The 'Collection ()' dropdown is also visible. On the left sidebar, there are icons for 'Search by Product', 'Online Archive', 'Filename Search', 'Image Viewer', 'Load/Save Search', and 'Past Orders'. The footer includes the NASA Goddard Space Flight Center logo, the text 'Level-1 and Atmosphere Archive & Distribution System', and a link to 'Privacy Policy and Important Notices'.



# Visualization Software

→ Science Toolbox Exploitation Platform

## SNAP

A common architecture for all Sentinel Toolboxes is being jointly developed by Brockman

The SNAP architecture is ideal for Earth Observation processing and analysis due to the Abstraction, Tiled Memory Management, and a Graph Processing Framework.

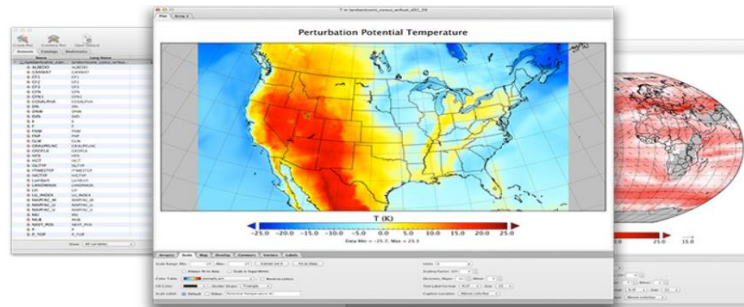
### Feature Highlights

- Common architecture for all Toolboxes
- Very fast image display and navigation even of giga-pixel images
- Graph Processing Framework (GPF): for creating user-defined processing chains
- Advanced layer management allows adding and manipulation of new overlays such
- Rich region-of-interest definitions for statistics and various plots
- Easy bitmask definition and overlay
- Flexible band arithmetic using arbitrary mathematical expressions
- Accurate reprojection and ortho-rectification to common map projections,
- Geo-coding and rectification using ground control points
- Automatic SRTM DEM download and tile selection
- Product library for scanning and cataloging large archives efficiently
- Multithreading and Multi-core processor support
- Integrated WorldWind visualisation

<https://step.esa.int/main/toolboxes/snap/>

## Panoply netCDF, HDF and GRIB Data Viewer

panoply ˈPAN-uh-plee, noun: 1. A splendid or impressive array. ...



Panoply plots geo-referenced and other arrays from netCDF, HDF, GRIB, and other datasets.

Panoply is a cross-platform application that runs on Macintosh, Windows, Linux and other desktop computers.

The current version of Panoply is 4.12.4, released 2021-02-28.

<https://www.giss.nasa.gov/tools/panoply/>

## SIFT

SIFT Home    Technical Specifications for SIFT    Blog Entries Describing SIFT Functionality

The **Satellite Information Familiarization Tool, or SIFT**, is a meteorological satellite imagery visualization software application with a graphical user interface designed at the University of Wisconsin Space Science and Engineering Center (SSEC) to run on mid-range consumer grade computers and notebooks. Built on Python, SIFT runs on Windows, Mac, and some Linux operating systems. The National Weather Service (NWS) originally funded the development of SIFT for use as a training application for Himawari-8 imagery at the forecast office in Guam, but SIFT has evolved into the primary learning software that accompanies the training exercises on the new-generation geostationary weather satellites.

SIFT is free to download and use as-is, with no expressed warranty or guarantee of support. Technical specifications for SIFT are [available](#). Workstations with a solid-state drive (SSD) will provide the best user experience.

Users can obtain Geostationary Operational Environmental Satellite R-Series (GOES-R) Advanced Baseline Imager (ABI) data readable with SIFT for download from the [NOAA Comprehensive Large Array-data Stewardship System \(CLASS\)](#), or, alternatively, the [Google Cloud Platform Marketplace](#). First-time users may wish to [watch a video](#) describing the basic SIFT functionalities.

The latest version of SIFT is **1.1.6**, released on **11 January 2021**. Our [FTP site](#) hosts SIFT installers for the two primary operating systems. Previous versions of SIFT can also be downloaded there.

- [Windows version](#) (841 MB)
- [Mac version](#) (546 MB)
- [Linux version](#) (723 MB)

For specific installation instructions, see [GitHub](#). Open source code is available to download from [GitHub](#) as well.

<http://sift.ssec.wisc.edu/>

## McIDAS

Man computer Interactive Data Access System

HOME    ABOUT    MCIDAS-X    **MCIDAS-V**    MCIDAS-XCD    INGESTORS    LICENSING    SUPPORT

About    Download    Documentation    Sample Capabilities

### Download McIDAS-V

free, open source software for 3D geophysical data analysis and visualization

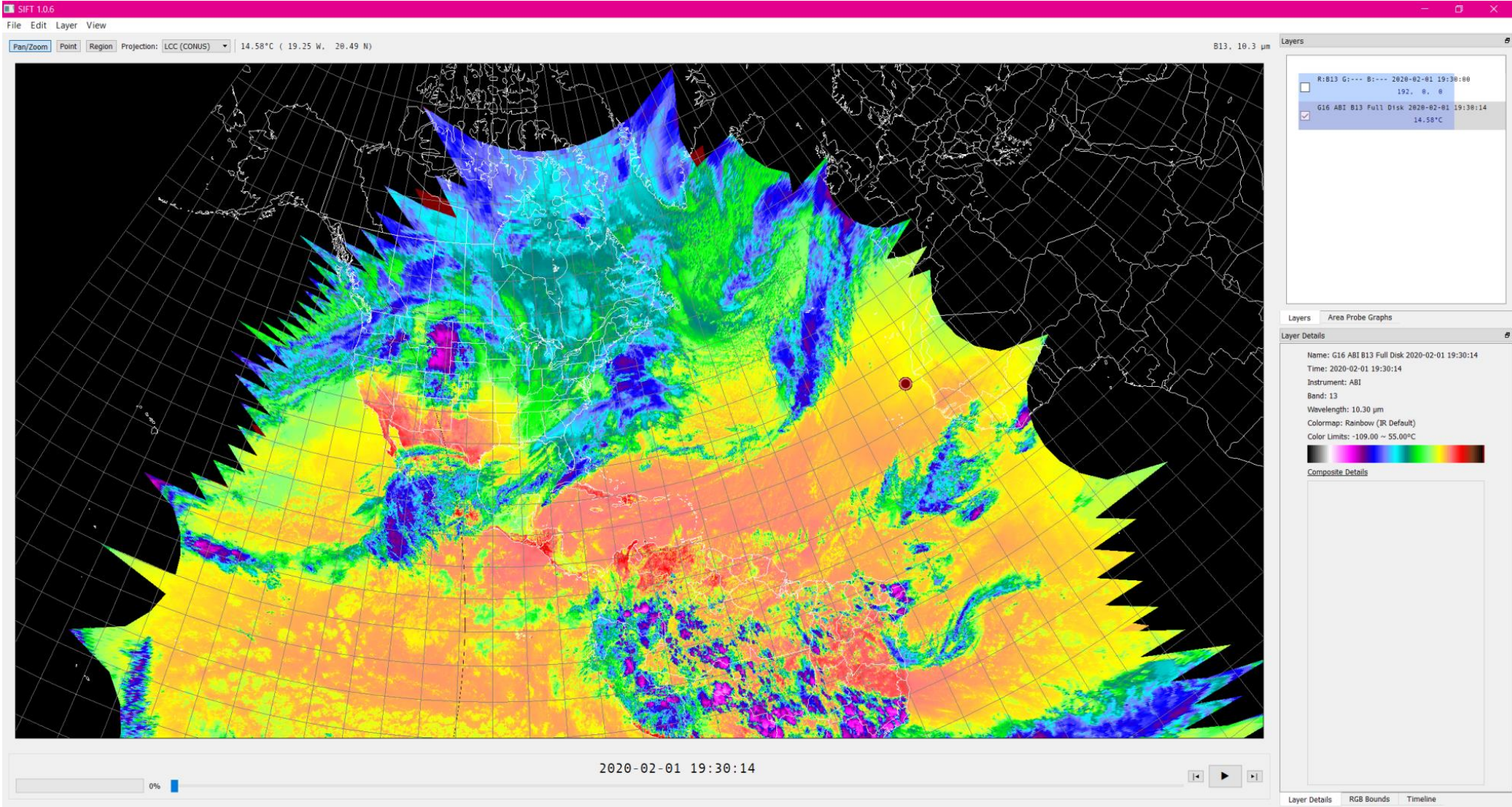
McIDAS-V runs on any platform that fully supports Java and Java 3D. Installers are available for Linux, macOS, and Windows, and McIDAS-V is tested and supported on all of these platforms. Other operating systems support the requirements in certain configurations, but have not been tested.

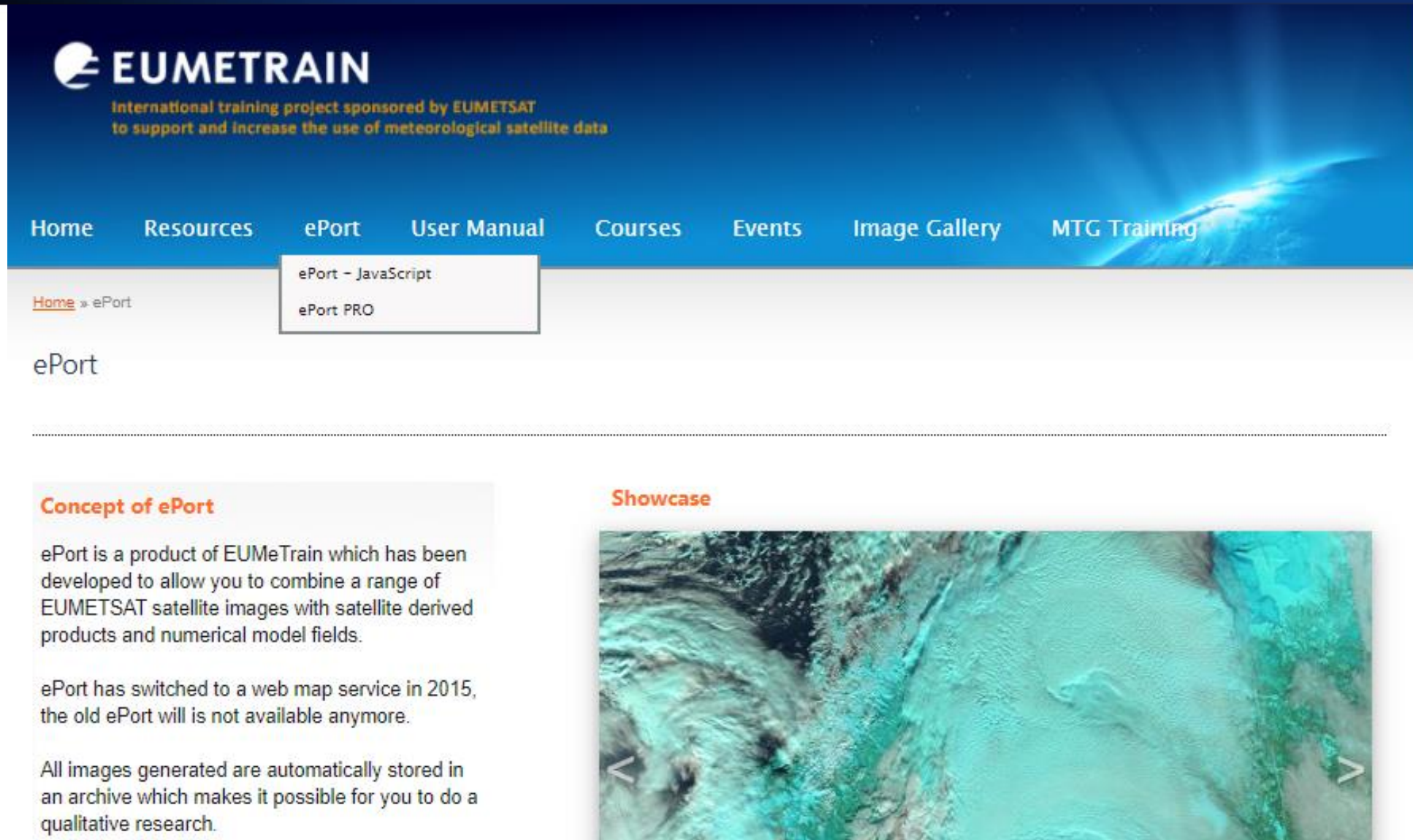
Jar files and source code are available for software developers, but should only be used by experienced Java programmers. The scripting and formula capabilities within McIDAS-V will be sufficient for most McIDAS-V users.

The current version of McIDAS-V is version 1.8 – in order to run McIDAS-V, there are certain minimum system requirements, as well as recommended configurations. If you are purchasing a new system for McIDAS-V, a 64 bit operating system with NVIDIA graphics card hardware and drivers is recommended. Performance will be better with faster processors and more memory. Please see the Complete System Requirements below for a list of all requirements and recommendations.

<https://www.ssec.wisc.edu/mcidas/software/v/>

# Visualization Software - Example





**EUMETRAIN**  
International training project sponsored by EUMETSAT  
to support and increase the use of meteorological satellite data

Home Resources **ePort** User Manual Courses Events Image Gallery MTG Training

[Home](#) » [ePort](#)

- ePort - JavaScript
- ePort PRO

## ePort

---

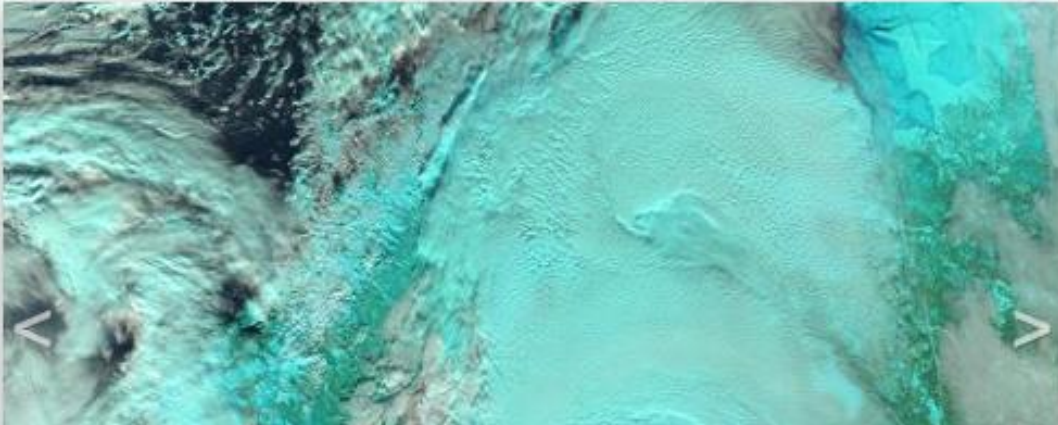
### Concept of ePort

ePort is a product of EUMeTrain which has been developed to allow you to combine a range of EUMETSAT satellite images with satellite derived products and numerical model fields.

ePort has switched to a web map service in 2015, the old ePort will is not available anymore.

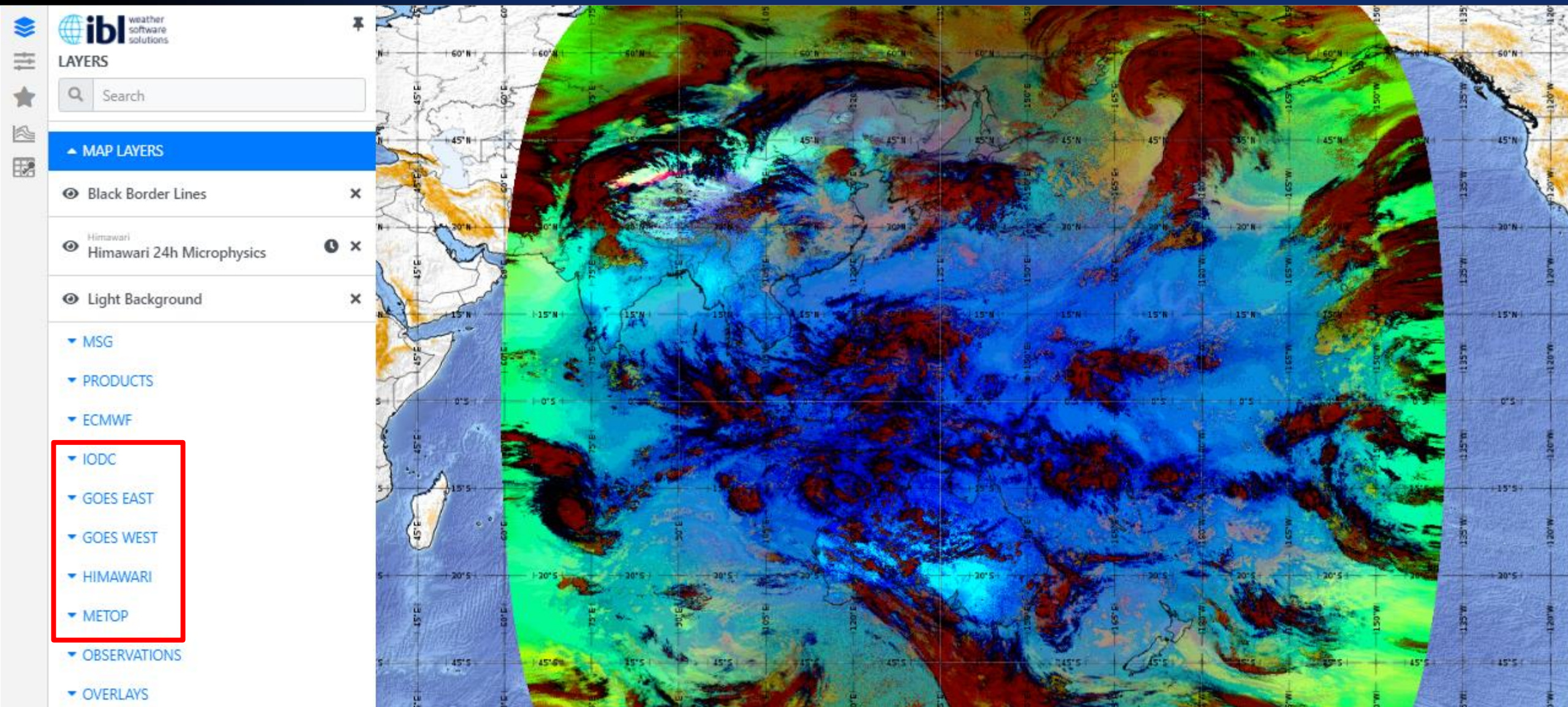
All images generated are automatically stored in an archive which makes it possible for you to do a qualitative research.

### Showcase



# Satellite data in the E-port

<http://eumetrain.org/e-port>



# Assistance tools: Next generation GEO - cheat sheet

IMAGING

"Colloquial" channel name	Applications	Advanced Baseline Imager				Flexible Combined Imager				Advanced Himawari Imager				Proxy instruments - λ(μm) / Res (km)			
		Ch. No.	Central λ (μm)	λ width (μm)	Resolution (km)	Ch. No.	Central λ (μm)	λ width (μm)	Resolution (km)	Ch. No.	Central λ (μm)	λ width (μm)	Resolution (km)	SEVIRI	MODIS	VIIRS	SLSTR
Blue	aerosol, surface features	1	0.47	0.04	1.0	1	0.44	0.06	1.0	1	0.47	0.05	1.0	-	0.44/1.0	0.45/0.75	-
Green	aerosol, vegetation					2	0.51	0.04	1.0	2	0.51	0.02	1.0	-	0.55/0.5	0.55/0.75	0.55/0.5
Red	fog, insolation, winds	2	0.64	0.10	0.5	3	0.64	0.05	1.0 (*0.5)	3	0.64	0.03	0.5	0.64/3.0	0.65/0.25	0.64/0.375	0.67/0.5
Veggie	vegetation, winds	3	0.86	0.04	1.0	4	0.86	0.05	1.0	4	0.86	0.02	1.0	0.81/3.0	0.86/1.0	0.87/0.375	0.86/0.5
Low-level WV	water vapour, winds					5	0.91	0.02	1.0					-	0.91/1.0	-	-
Cirrus	thin cirrus	4	1.38	0.02	2.0	6	1.38	0.03	1.0					-	1.38/1.0	1.38/0.75	1.38/0.5
Snow/Ice	cloud phase, snow/ice	5	1.61	0.06	1.0	7	1.61	0.05	1.0	5	1.61	0.02	2.0	1.64/3.0	1.64/0.5	1.61/0.375	1.61/0.5
Particle Size	particle size, vegetation	6	2.25	0.05	2.0	8	2.25	0.05	1.0 (*0.5)	6	2.25	0.02	2.0	-	-	2.25/0.75	2.25/0.5
Fire	microphysics, fires	7	3.90	0.20	2.0	9	3.80	0.40	2.0 (*1.0)	7	3.88	0.22	2.0	3.92/3.0	3.75/1.0	3.74/0.375	3.74/1.0
High-level WV	WV, winds, rainfall	8	6.19	0.80	2.0	10	6.30	1.00	2.0	8	6.24	0.37	2.0	6.25/3.0	-	-	-
Mid-level WV	WV, winds, rainfall	9	6.95	0.40	2.0					9	6.94	0.12	2.0	-	6.72/1.0	-	-
Lower-level WV	WV, winds, SO2	10	7.34	0.20	2.0	11	7.35	0.50	2.0	10	7.34	0.17	2.0	7.35/3.0	7.33/1.0	-	-
Cloud-top phase	cloud phase, SO2	11	8.50	0.40	2.0	12	8.70	0.40	2.0	11	8.59	0.32	2.0	8.70/3.0	8.55/1.0	8.55/0.75	-
Ozone	total O3, turbulence	12	9.61	0.40	2.0	13	9.66	0.30	2.0	12	9.64	0.18	2.0	9.66/3.0	9.73/1.0	-	-
Clean IR	SST, clouds temp	13	10.35	0.50	2.0	14	10.50	0.70	2.0 (*1.0)	13	10.40	0.30	2.0	10.8/3.0	11.0/1.0	10.8/0.75	10.8/1.0
IR Longwave	SST, clouds temp, rainfall	14	11.20	0.80	2.0					14	11.23	0.20	2.0	-	-	11.5/0.375	-
Dirty IR	TPW, dust, ash	15	12.30	1.00	2.0	15	12.30	0.50	2.0	15	12.38	0.30	2.0	12.0/3.0	12.0/1.0	12.0/0.75	12.0/1.0
CO2	air temp, cloud height	16	13.30	0.60	2.0	16	13.30	0.60	2.0	16	13.28	0.20	2.0	13.4/3.0	13.3/1.0	-	-

MODUS OPERANDI:



Full disc	< 83°	15 min	0.5 - 2.0 km
Continental US (CONUS)	5000 x 3000 km	5 min	0.5 - 2.0 km
Mesoscale	1000 x 1000 km	0.5 min	0.5 - 2.0 km

Flex Mode: The flex mode provides a full disk scan every 15 minutes, a CONUS every 5 minutes, and two mesoscale every 60 seconds (or one sub-region every 30 seconds).

Full disc	?	10 min	1.0 - 2.0 km
Rapid Scan	LAC 4 (top disc quarter)	2.5min	0.5 - 1.0 km

\* The channels VIS 0.6, NIR 2.2, IR 3.8 and IR 10.5 are delivered in advanced resolution in the rapid sampling configuration.

Full disc	?	10 min	0.5 - 2.0 km
Japan region	2000 x 1000 km	2.5 min	0.5 - 2.0 km
Target area	1000 x 1000 km	2.5 min	0.5 - 2.0 km
Landmark area / x2	1000 x 500 km	0.5 min	0.5 - 2.0 km

# Assistance tools: Next generation GEO - cheat sheet

	Pioneer instrument - LIS	Geostationary Lightning Mapper	Lightning Imager	Lightning Mapping Imager	Ground network - GLD360
Platform	TRMM/ISS	GOES-16	MTG-I	Feng-Yun-4	~
Orbit	LEO	GEO	GEO	GEO	~
Description	CCD camera operating at 777.4 nm (O2) to count flashes and measure their intensity	CCD camera operating at 777.4 nm (O2) to count flashes and measure their intensity	CCD camera operating at 777.4 nm (O2), flash counts and intensity measurement. Detection efficiency > 90 % for events of 10 $\mu\text{m}^2\text{sr}^{-1}$ at 45° (day), 4 $\mu\text{m}^2\text{sr}^{-1}$ (night). FAR < 2 s <sup>-1</sup>	CCD camera operating at 777.4 nm (O2) to count flashes and measure their intensity	A network of sensors operating in the Very Low Frequency (VLF) band and measuring horizontal magnetic fields of radio impulses generated by return strokes and large cloud pulses.
Scanning technique	Pushbroom matrix array of 128 x 128 detectors, swath 600 km; each earth location observed continuously (every 2 ms) for about 90 s	Electronic, 3-axis stabilised satellite, single detector matrix	Electronic, 3-axis stabilised satellite, single detector matrix	Electronic, 3-axis stabilised satellite, single detector matrix	Fixed location, ground-Based detectors
Resolution	4 km	8 km at s.s.p. (sub-satellite point)	10 km	7.8 km at s.s.p.	2-3 km
Coverage /Cycle	Passes at ~ 100-min intervals with longer gaps once or twice per day. More regular coverage at 15°N and 15°S. On ISS: latitude coverage extended to 51.6°	Large fraction of the disk continuously observed (time resolution 2 ms)	Full disk continuously observed (time resolution ~ 2 ms)	Full disk continuously observed (time resolution ~ 2 ms)	Global

	Proxy instrument - IASI	Proxy instrument - CrIS	Infra-Red Sounder	Geostationary Interferometric IRS
Platform	EPS-A/B/C	NOAA-20	MTG-S	Feng-Yun-4
Orbit	LEO	LEO	GEO	GEO
Description	Interferometer with 8461 channels, with one embedded IR imaging channel	Interferometer with three IR bands, 1305 channels in initial operation mode. Future operation mode will have 2211 channels with the same full spectral resolution in all three bands.	Interferometer with large detector arrays for simultaneous sounding of more pixels	MWIR/TIR interferometer with large detector arrays for simultaneous sounding of more pixels. 913 channels on the first flight unit, 1188 on follow-on flight units.
Scanning technique	Cross-track: 30 steps of 48 km s.s.p., swath 2130 km - Along-track: one 48-km line every 8 s	Cross-track: 32 steps of 48 km s.s.p., swath 2200 km - Along-track: one 48-km line every 8 s	Mechanical, bi-axial, 3-axis stabilised satellite, step-and-dwell of a detector matrix	Mechanical, bi-axial, 3-axis stabilised satellite, step-and-dwell of a detector matrix.
Resolution	4 x 12-km IFOV close to the centre of a 48 x 48 km <sup>2</sup> cell (average sampling distance: 24 km)	3 x 3 14 km IFOV covering a 48 x 48 km <sup>2</sup> cell (average sampling distance: 16 km)	4.0 km	Prototype flight 16 km, follow-on 8 km, at s.s.p.. Supporting VIS: 2 km at s.s.p.
Coverage /Cycle	Near-global coverage twice/day	Near-global coverage twice/day	Full disk in 60 min. Limited areas in correspondingly shorter time intervals	China area (5000 km x 5000 km) in 67 min. Mesoscale area (1000 km x 1000 km) in 35 min

LIGHTNING DETECTION

SOUNDING


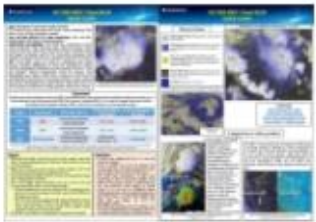
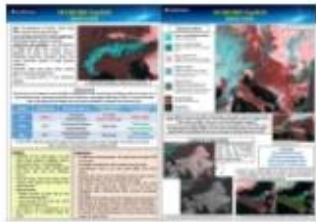
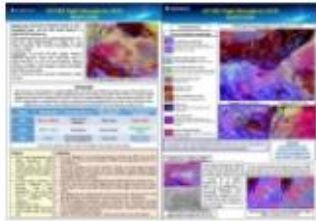
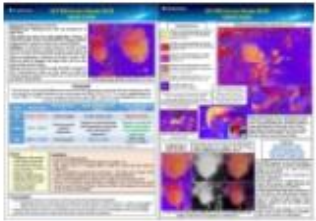
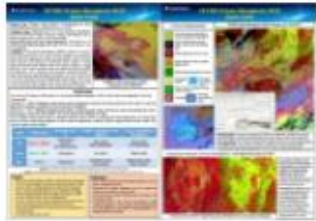
# RGB Quick guides, colour interpretation guides

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# RGB Quick guides, colour interpretation guides



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## RGB Colour Interpretation Guide

[Description](#) on how to create the EUMETSAT suggested standard RGB images from Meteosat/SEVIRI, Metop/AVHRR and VIIRS data.  
[Download](#) the RGB Colour Interpretation tool:  
[Nighttime Microphysics RGB](#) and [Daytime Convection](#) RGB for ABI sensor developed by SPORT.

Satellite Instrument: --all--  
RGB: --all--  
Colour: --all--  
Phenomena: --all--

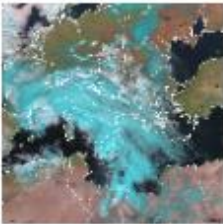
106 results found

Pages: 1 2 3 4




Natural Colour RGB  
Snow and ice on the ground  
Description  
In the Natural Colour RGB, snow and ice on the earth surface depict in cyan colour. [more...](#)

Click to enter



Natural Colour RGB  
Ice clouds  
Description  
In the Natural Colour RGB, ice clouds depict in cyan colour. [more...](#)

Click to enter



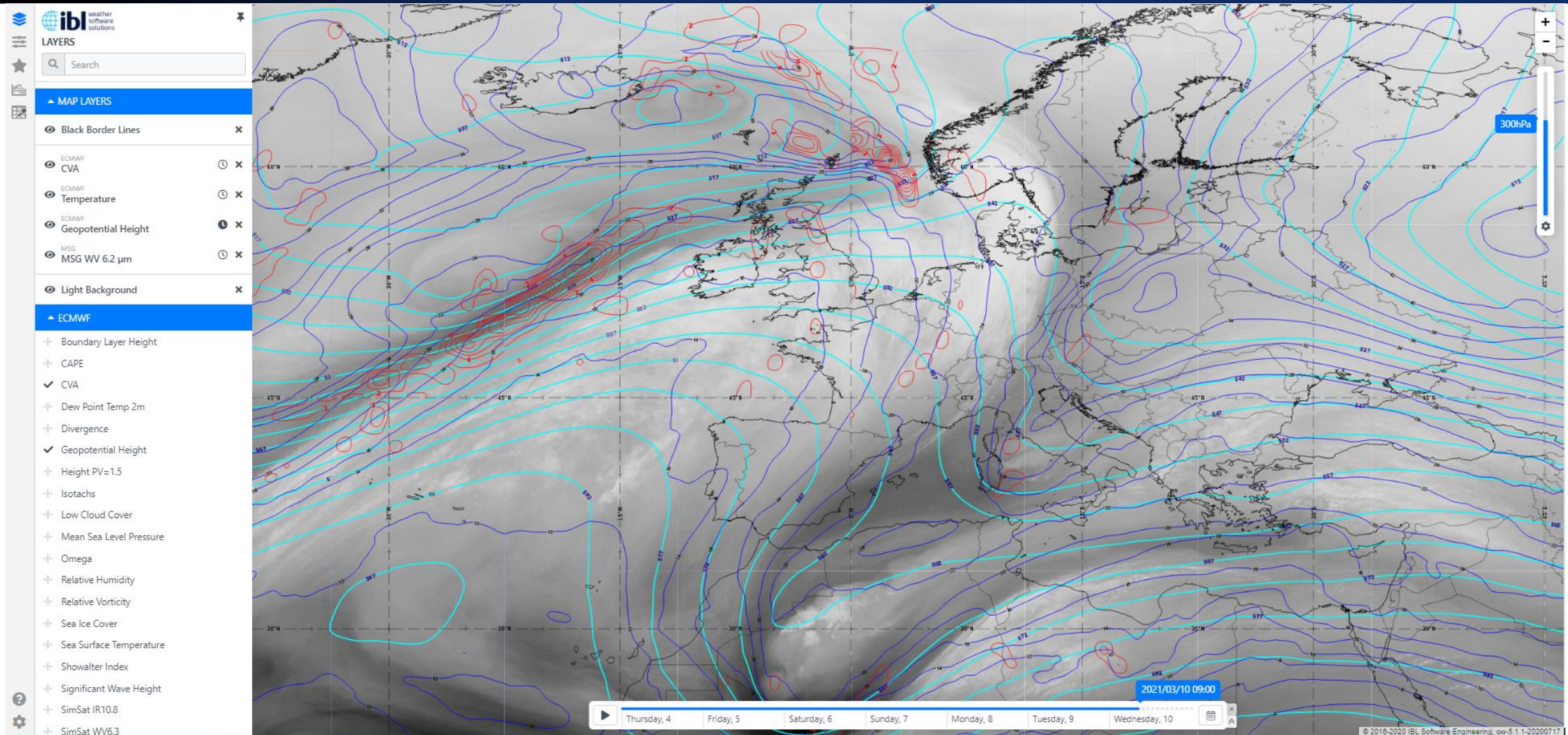
Natural Colour RGB  
Oceans and lakes  
Description  
In the Natural Colour RGB, oceans and lakes depict in black colour. [more...](#)

Click to enter



# Images + NWP model data

<http://eumetrain.org/e-port>



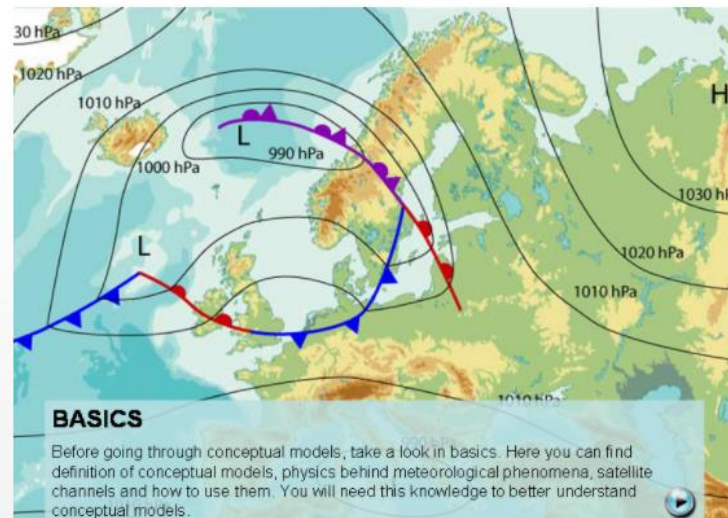
# Satmanu



## Manual of Synoptic Satellite Meteorology



In 1996, the compilation of a "Manual of Synoptic Satellite Meteorology – Conceptual Models" (or CMs SatManu) was started, initially by the Austrian Meteorological Institute (ZAMG), but later in co-operation with the Dutch, Finnish and Croatian Meteorological Institutes (KNMI, FMI and DHMZ resp.). The material in this manual was produced in electronic form as a CD-ROM within the framework of the sponsored "SATREP" Project of EUMETSAT and is also available online.



### BASICS

Before going through conceptual models, take a look in basics. Here you can find definition of conceptual models, physics behind meteorological phenomena, satellite channels and how to use them. You will need this knowledge to better understand conceptual models.

# Consult colleagues, expert groups

- regional training communities
- CWG
- MTG Forum
- EUMETSAT trainers/experts
- topcase email



# Case studies

Imagery and case studies of weather phenomena and environmental events observed by EUMETSAT's fleet of weather satellites.

Want to join us?  
Have ideas of your own?

**Let's do a CS together!**

# Follow-up demo session

- In a week time (24<sup>th</sup> March) we get together and discuss:
  - Objective of your case study (Why did you choose it? What do you want to show? What is the importance of the CS?)
  - Scope of your CS (Which case? Which conceptual models to use? What kind of data?)
  - Which tools did/would you utilise?
  - Who did/would you collaborate with?
  - Would you like to publish the CS in the EUMETSAT case study library?



<https://padlet.com/TrainingEUMETSAT/z8es6rqcwo7y7ecs>

Enjoy making a case study!

See you next Wednesday!