

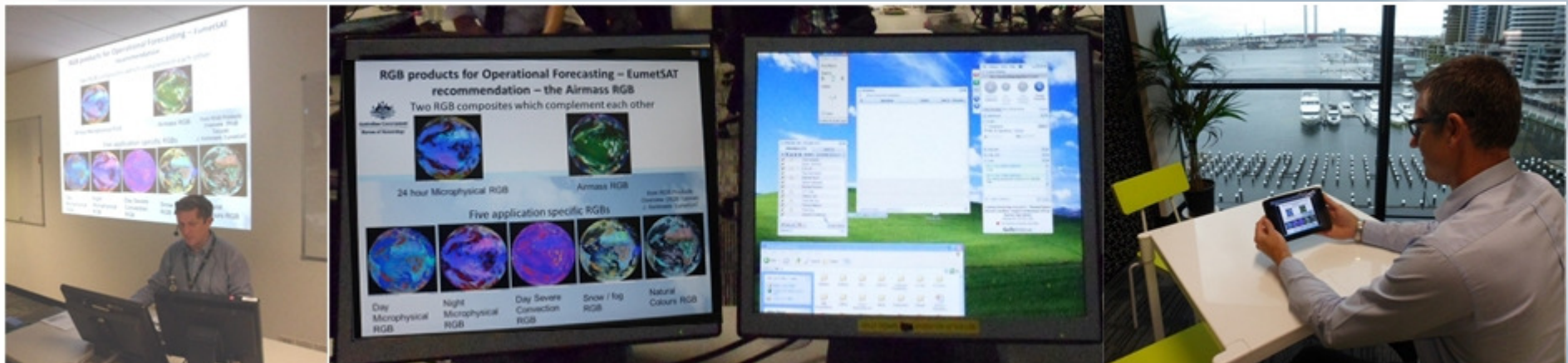


Australian VLab Centre of Excellence Science Week 2015



Using RGB and Derived Products: Practical Session

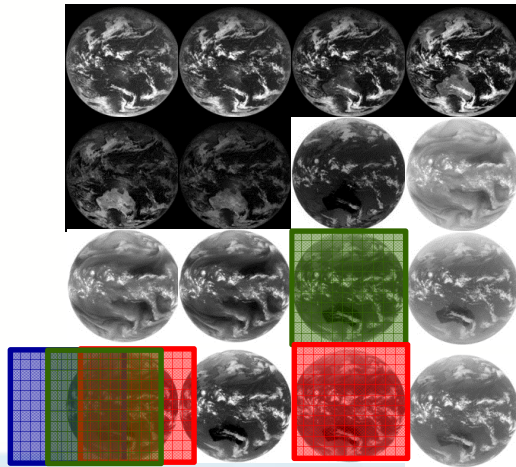
(Facilitator: Bodo Zeschke, BMTC)



Content

- Brief introduction into RGB and Derived Products
- Derived Products to be used with Himawari-8 data in the Bureau
- Getting our hands dirty - comparing RGB and Derived Products on the EUMETSAT ePort web page.
- The advantage of RGB products over single channel products
- Comparing RGB products with Derived Products – advantages and disadvantages.
- Gaining a better understanding of RGB products by overlaying appropriate NWP parameters (NWP fields).

Reminder: RGB products (the 24hour Microphysics -Dust RGB)



Recommended Range and Enhancement:

Beam	Channel	Range	Gamma	Gamma2
Red	IR12.0 - IR10.8	-4 ... +2	1.0	1.0
Green	IR10.8 - IR8.7	0 ... +15	2.5	1.0
Blue	IR10.8	+261 ... +289	1.0	1.0

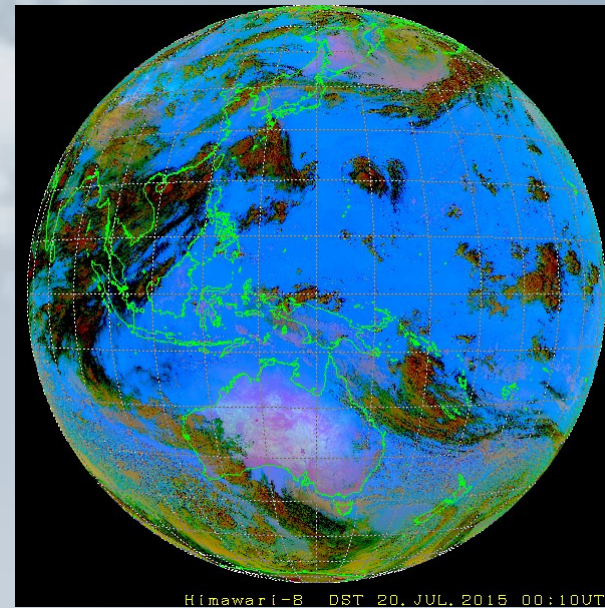
Channel combination "recipe" (from EUMETSAT)

Himawari-8 channels

Dust RGB : Interpretation of Colours

Cold, thick, high-level clouds	Thin Cirrus clouds Contrails			
Thick, mid-level cloud	Thin, mid-level cloud			
Low-level cloud (cold atmosphere, Europe)	Low-level cloud (warm atmosphere, Africa)	Dust Storm		
Ocean	Warm Desert	Cold Desert	Warm Land	Cold Land

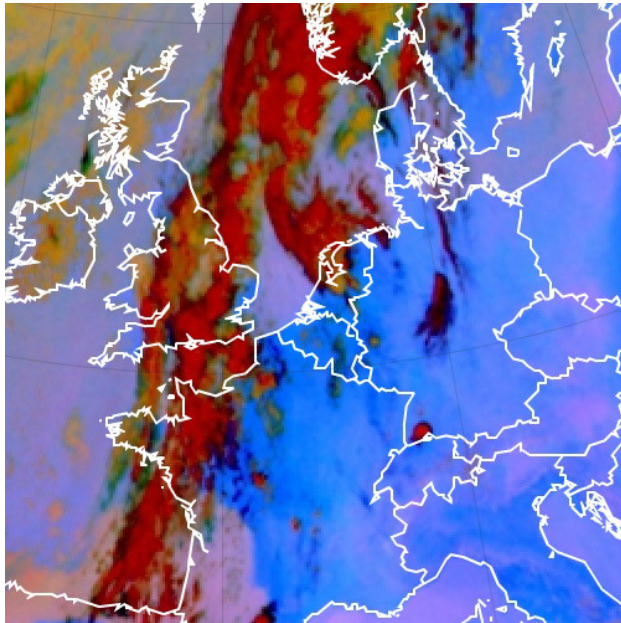
Colour interpretation palette



Dust RGB product

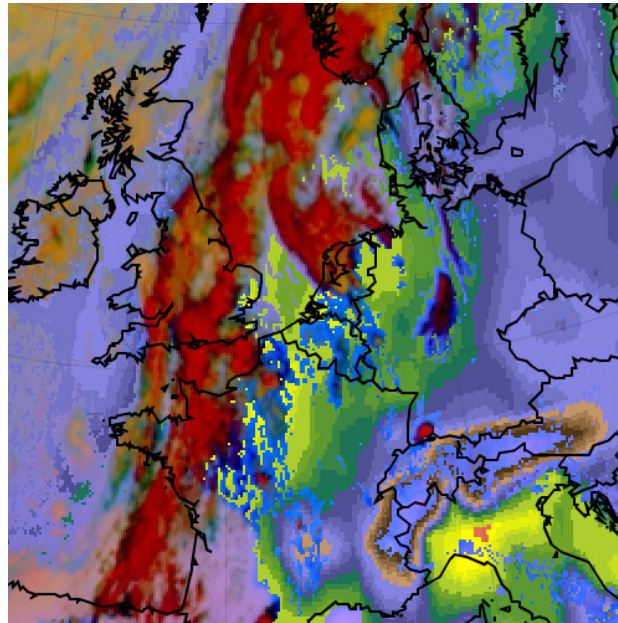
Himawari-8 DST 20. JUL. 2015 00:10UTC

Derived Products – the blending of satellite data with NWP

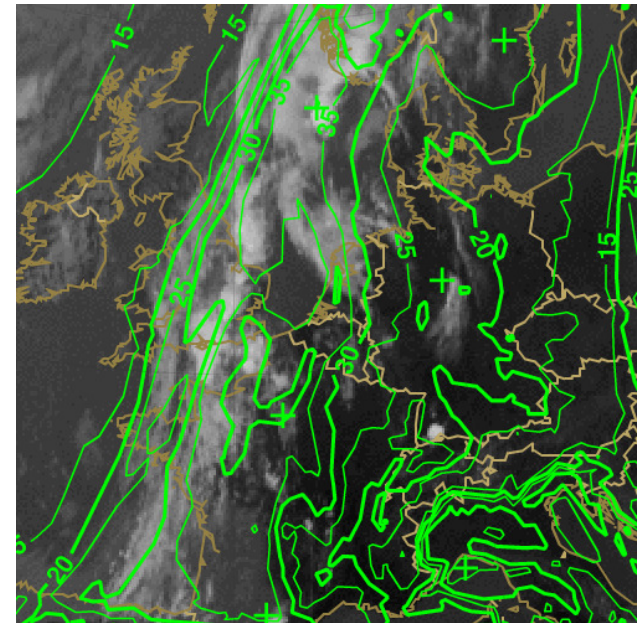


24-hour Microphysics RGB

RGB Image
Real



Derived Product (TPW)
“Semi” Real



NWP (TPW)
Not Real

Bureau use of Derived Products (Phase 2)

(from the Himawari 8 and 9 Project HIM89 Project Definition)

PHASE 2A	FOG MASK SUITE [NOAA]	VOLCANIC ASH RETRIEVAL SUITE [NOAA]	CLOUD PROPERTIES [NOAA]
	FOG PROBABILITY SUITE (BY LAYER) [NOAA]	VOLCANIC ASH PROBABILITY SUITE [NOAA]	CLOUD MICROPHYSICAL PROPERTIES SUITE [NOAA]
	ATMOSPHERIC MOTION VECTORS SUITE	SOLAR RADIATION SUITE	SEA SURFACE TEMPERATURE SUITE
PHASE 2B	AIRCRAFT ICING POTENTIAL	VOLCANIC ASH OBJECT INFORMATION SUITE [NOAA]	SEA SURFACE TEMPERATURE SUITE

Reminder: National Himawari-8 Training Campaign

<http://www.virtuallab.bom.gov.au/training/hw-8-training/>

Australian Government
Bureau of Meteorology

Melbourne VLab Centre Of Excellence

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Australian VLab Centre of Excellence
National Himawari-8 Training Campaign

The Campaign will assist Australian Bureau of Meteorology, WMO Region V and other stakeholders in preparing for the effective use of Himawari-8 data prior to its availability using existing satellite resources. Ongoing liaison and training to stakeholders will be given once the Himawari-8 data becomes available.

Phase 1: Familiarisation Resources (rapid scan)	Learning Outcomes	Phase 1: Familiarisation Resources (RGB products)
Phase 2: Introduction, Resources and Case Studies	Instructions and Timeline	Phase 2: Himawari-8 and related satellite Blogs (to be posted soon)
Phase 2: Tutorial Sessions and Feedback	Objectives	Tutorial Sessions and Feedback

Reminder: National Himawari-8

<http://www.virtuallab.bom.gov.au/training>

Australian Government Bureau of Meteorology

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The Campaign will assist Australian Bureau of Meteorology in preparing for the effective use of Himawari-8 data products. Ongoing liaison and training to stakeholders will be provided.

Phase 1: Familiarisation Resources (rapid scan)

Phase 2: Introduction, Resources and Case Studies

Phase 2: Tutorial Sessions and Feedback

Australian Government Bureau of Meteorology

Melbourne VLab Centre Of Excellence

Home Satellite Products Events Training News Archive Links Contact Us

Home > Training > National Himawari-8 Training Campaign > Introduction Resources and Case Studies

Australian VLab Centre of Excellence National Himawari-8 Training Campaign

Training Campaign Phase 2: Introduction, Resources and Case Studies

Introduction and Instructions

This Phase 2 of the Campaign will involve:

- Easily accessible resources for Stakeholder familiarisation with the new data from Himawari-8 and how it may be best used.
- A Blog page for ongoing discussion of case studies using Himawari-8 data. Blog resources from other organisations (eg CIMSS) also.
- Weekly tutorial sessions to consolidate the learning.
- Assessment resources on the BMTC Moodle web page.

How Forecasters can use the new Himawari-8 data effectively

Click on the links below to see how Forecasters can use the new Himawari-8 data effectively for the nowcasting and forecasting of the respective meteorological phenomena. Note that this is an evolving resource and your feedback and additional material is welcome.

General Comments	Broadscale / Synoptic Scale	Tropical Cyclones	Thunderstorms
Fog / Low Cloud	Fire and Smoke	Volcanic Ash	Dust
Turbulence	Other Features (to be added)	Other Features (to be added)	Other Features (to be added)

The summary table "How Forecasters can use the new Himawari-8 data effectively" is here.

Red-Green-Blue (RGB) Product reference information.

In response to the stakeholder feedback during Phase 1 of the Campaign, below are easy-to-use resources pertaining to the RGB products. These .pdf files include:

- How the RGB products are constructed
- Uses and limitations of the products.
- EUMETSAT ePort exercises for you to try in order to gain familiarisation with the products.

Dust RGB	Ash RGB	Airmass RGB	Day Microphysics RGB
Additional RGB (to be added)	Night Microphysics RGB	Day Convection RGB	Additional RGB (to be added)

Useful additional Himawari-8 channels

(to be added at a future date)

Derived Products

(to be added at a future date)

Case Studies

(to be added at a future date)

[Return to main webpage](#)

Date created: Fri, 29 May 2015
Last modified: Sun, 31 May 2015 23:28:14 +0000
Page count: 000070

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National Himawari-8 Training Campaign Phase 2

Red-Green-Blue (RGB) Product reference information.

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 Dust RGB	 Ash RGB	 Airmass RGB	 Day Microphysics RGB
Additional RGB (to be added)	 Night Microphysics RGB	 Day Convection RGB	

- RGB product reference .pdf files for easy Forecaster reference.
- Most include EUMETSAT ePort exercise.

Australian VLab Centre of Excellence
National Himawari-8
Training Campaign

The Airmass RGB product

Should you use these resources please acknowledge the Australian VLab Centre of Excellence. In addition, you need to retain acknowledgement in the PowerPoint slides of EUMETSAT, the Japan Meteorological Agency, the Bureau of Meteorology and any other sources of information.

Compiled by Bodo Zeschke, BMTC, Australian Bureau of Meteorology, using information from various sources, May 2015

Contents

- Introduction
 - The many channels of Himawari-8
 - The seven WMO endorsed RGB products
- Familiarisation with the RGB product
 - Colour blindness test
 - How the RGB product is created (channel combination recipe, beams explained)
 - Identifying features in the RGB product and relating this to the palette
 - Complications in the imagery
- Case Study
 - Displaying the data (EUMETSAT ePort)
 - Comparing the RGB product with single channel data, overlaying model fields, Derived Products etc. and interpreting the data using a Conceptual Model
 - Examining the RGB product in animation
- Summary and Appendix – useful reference material.



Learning Outcomes

At the end of this exercise you will:

- Have a basic knowledge how the Airmass RGB product is constructed from multiple satellite channels and the physics and meteorology underpinning this.
- Be able to identify and locate mid and upper atmosphere features such as ozone rich intrusions associated with jetstreams, upper lows etc. and their developments in the Airmass RGB product.
- Have a better understanding of the advantages and the limitations of the Airmass RGB product.
- Through using the EUMETSAT ePort gain a "hands on experience" in using this RGB product in combination with other observations, Derived Products and Numerical Weather Prediction (NWP) models. By applying Conceptual Models be able to nowcast and short term forecast mid-upper atmospheric features.
- Have a better appreciation of using the Airmass RGB product when monitoring, nowcasting and short term forecasting of middle and upper atmospheric features.
- Note – corresponding WMO-1083 Capabilities and BOM Enabling Skills are given in Appendix 1

The Japanese Geostationary Satellites Himawari 8/9

Band	Central Wavelength [µm]	Spatial Resolution
1	0.43 - 0.48	10km
2	0.50 - 0.52	2km
3	0.63 - 0.66	0.5km
4	0.85 - 0.87	2km
5	1.60 - 1.62	2km
6	2.25 - 2.27	2km
7	3.74 - 3.96	2km
8	6.06 - 6.43	2km
9	6.89 - 7.01	2km
10	7.26 - 7.43	2km
11	8.44 - 8.76	2km
12	9.54 - 9.72	2km
13	10.3 - 10.6	2km
14	11.1 - 11.3	2km
15	12.2 - 12.6	2km
16	13.2 - 13.4	2km



気象庁
Japan Meteorological Agency

from JMA

National Himawari-8 Training Campaign Resources

Red-Green-Blue (RGB) Product reference information.

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- EUMETSAT ePort exercises for you to try in order to gain familiarisation with the products.

 Dust RGB	 Ash RGB	 Airmass RGB	 Day Microphysics RGB
Additional RGB (to be added)	 Night Microphysics RGB	 Day Convection RGB	

EUMETSAT ePort exercises

Activity: Exploring EUMETRAIN ePort

- To gain "hands on experience" in using this RGB product in combination with other observations, Derived Products and NWP, please take some time to work through the following ePort activities.
- EUMETRAIN ePort helps to integrate the RGB products with single channel satellite data.
- It helps to integrate RGB products with Derived Products.
- You can explore the RGB products by overlaying model parameters to get a better feel for the products.
- The ePort can give a "flavour" of what we might expect with the display of Himawari-8 data, although the way this data will be displayed in Visual Weather, SatAID and on the web may be different from the ePort.

image courtesy EUMETSAT

Activity: Exploring EUMETRAIN ePort – may work best in Firefox <http://eumetrain.org/eport.html>

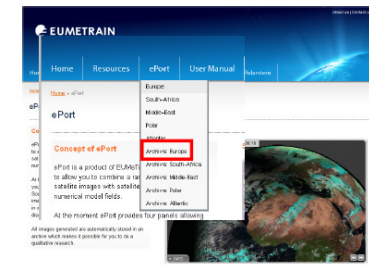
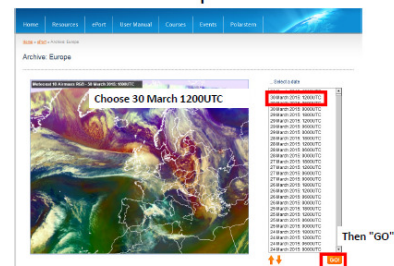


image courtesy EUMETSAT

Activity: Exploring EUMETRAIN ePort – choosing Archive: Europe



Activity: Exploring EUMETRAIN ePort

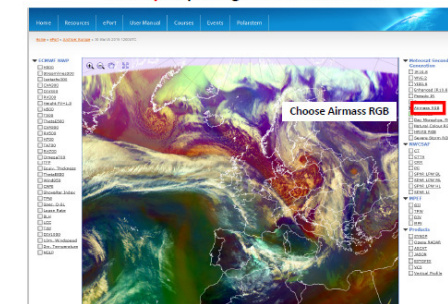


image courtesy EUMETSAT

Activity: Exploring EUMETRAN ePort – may work best in Firefox <http://eumetrain.org/eport.html>

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EUMETRAN

Home » ePort

ePort

Concept of ePort

ePort is a product of EUMETSAT to allow you to combine a rare satellite images with satellite numerical model fields.

At the moment ePort provides four panels allowing

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

Archive: Europe

Archive: South-Africa

Archive: Middle-East

Archive: Polar

Archive: Atlantic

09:15

INFO

Case Study 1: Airmass RGB Product, Europe

Home Resources ePort User Manual Courses Events Polarstern

Home » ePort » Archive: Europe

Archive: Europe

Meteosat 10 Airmass RGB - 30 March 2015: 1800UTC

Choose 30 March 1200UTC

... Select a date

- 30 March 2015: 1200UTC
- 30 March 2015: 0600UTC
- 30 March 2015: 0000UTC
- 29 March 2015: 1800UTC
- 29 March 2015: 1200UTC
- 29 March 2015: 0600UTC
- 29 March 2015: 0000UTC
- 28 March 2015: 1800UTC
- 28 March 2015: 1200UTC
- 28 March 2015: 0600UTC
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- 26 March 2015: 0000UTC
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- 25 March 2015: 1200UTC
- 25 March 2015: 0600UTC
- 25 March 2015: 0000UTC
- 24 March 2015: 1800UTC
- 24 March 2015: 1200UTC
- 24 March 2015: 0600UTC
- 24 March 2015: 0000UTC

↑ ↓

GO!

Then "GO"

Activity: Exploring EUMETRAIN ePort

Home Resources ePort User Manual Courses Events Polarstern

Home » ePort » Archive: Europe » 30 March 2015 1200UTC

▼ ECMWF NWP

- H300
- Streamlines300
- Isotachs300
- CVA300
- DIV300
- RV300
- Height_PV=1.5
- H500
- T500
- ThetaE500
- CVA500
- RV500
- H700
- TA700
- RH700
- Omega700
- TFP
- Equiv. Thickness
- ThetaE850
- Wind850
- CAPE
- Showalter Index
- TPW
- Spec. Q-BL
- Lapse Rate
- BLH
- LCC
- Tdd
- DIV1000
- 10m. Windspeed
- 2m. Temperature
- MSLP



Choose Airmass RGB

▼ Meteosat Second Generation

- IR10.8
- WV6.2
- VIS0.6
- Enhanced IR10.8
- Pseudo IR
- Airmass RGB
- Day Microphys. RGB
- Natural Colour RGB
- HRVIS RGB
- Severe Storm RGB

▼ NWCSAF

- CT
- CTTH
- CRR
- PC
- SPhR LPW BL
- SPhR LPW ML
- SPhR LPW HL
- SPhR LI

▼ MPEF

- GII
- TPW
- DIV
- MPE

▼ Products

- SYNOP
- Opera RADAR
- ASCAT
- JASON
- ESTOFEX
- VCS
- Vertical Profile

EUMETRAIN

Activity: Exploring EUMETRAIN ePort

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▼ ECMWF NWP

- H300
- Streamlines300
- Isotachs300
- CVA300
- DIV300
- RV300
- Height_PV=1.5
- H500
- T500
- ThetaE500
- CVA500
- RV500
- H700
- TA700
- RH700
- Omega700
- TFP
- Equiv. Thickness
- ThetaE850
- Wind850
- CAPE
- Showalter Index
- TPW
- Spec. Q-BL
- Lapse Rate
- BLH
- LCC
- Tdd
- DIV1000
- 10m. Windspeed
- 2m. Temperature
- MSLP

▼ Meteosat Second Generation

- IR10.8
- WV6.2
- VIS0.6
- Enhanced IR10.8
- Pseudo IR
- Pseudo WV
- Airmass RGB**
- Day Tropophys. RGB
- Night Colour RGB
- HR VIS RGB
- Sphere Storm RGB

▼ NIVCSAF

- CT
- CTTH
- CRR
- PC
- SPhR LPW BL
- SPhR LPW ML
- SPhR LPW HL
- SPhR LI

▼ MDPF

- SFC Level
- VCS
- Vertical Profile

Airmass RGB

Airmass is an RGB composite based upon data from infrared and water vapour channels from Meteosat Second Generation. It is designed and tuned to monitor the evolution of cyclones, in particular rapid cyclogenesis, jet streaks and PV (potential vorticity) anomalies (appear reddish in the image).

Due to the incorporation of the water vapour and ozone channels, its usage at high satellite viewing angles is limited. The Airmass RGB is composed from data from a combination of the SEVIRI WV6.2, WV7.3, IR9.7 and IR10.8 channels and can thus be used day and night.

Meteosat 8 - Airmass RGB: 7 January 2005 1500UTC

Cold air mass, low tropopause

Dry descending stratospheric air

Mid level clouds

High clouds

Warm air mass, high tropopause

Click on title to obtain further information about the data you have chosen

EUMETRAIN

Activity: Comparing single channel images with RGB product

Question: annotate the areas where the RGB product is giving more information

Compare the RGB product with single channel IR and VIS and 6.2 micron water vapour images

- First make all of the highlighted options active
- Then turn the Day Microphys. RGB option on and off

ECMWF NWP

- H300
- Streamlines300
- Isotachs300
- CVA300
- DIV300
- RV300
- Height_PV=1.5
- H500
- T500
- ThetaE500
- CVA500
- RV500
- H700
- TA700
- RH700
- Omega700
- TFP
- Equiv. Thickness
- ThetaE850
- Wind850
- CAPE
- Showalter Index
- TPW
- Spec. Q-BL
- Lapse Rate
- BLH
- LCC
- Tdd
- DIV1000
- 10m. Windspeed
- 2m. Temperature
- MSLP

Meteosat Second Generation

- IR1080
- WV6.2
- VIS0.6
- Pseudo_IR
- Pseudo_wv
- Airmass_RGB
- Dust_RGB
- Day_Microphys. RGB
- Natural Colour RGB
- HRVIS RGB
- Severe_Storm_RGB

NWCSAF

- CT
- CTTH
- CRR
- PC
- SPhR_LPW_BL
- SPhR_LPW_ML
- SPhR_LPW_HL
- SPhR_LI

MPEF

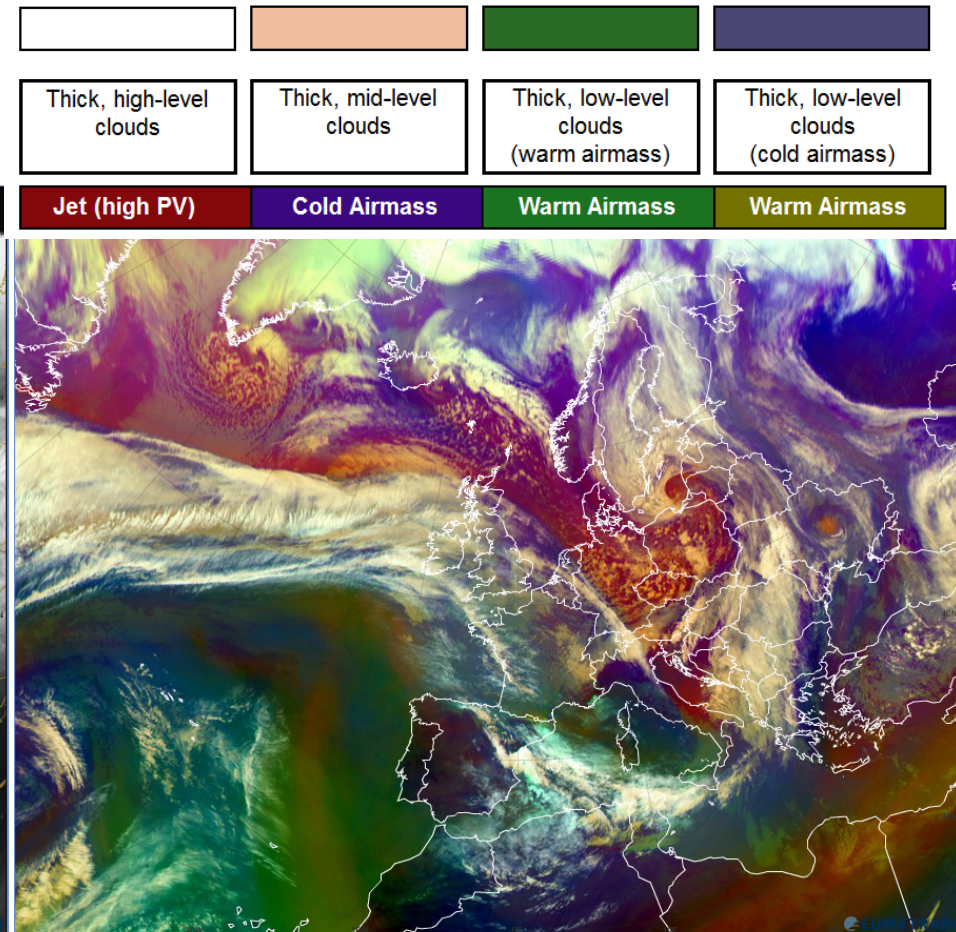
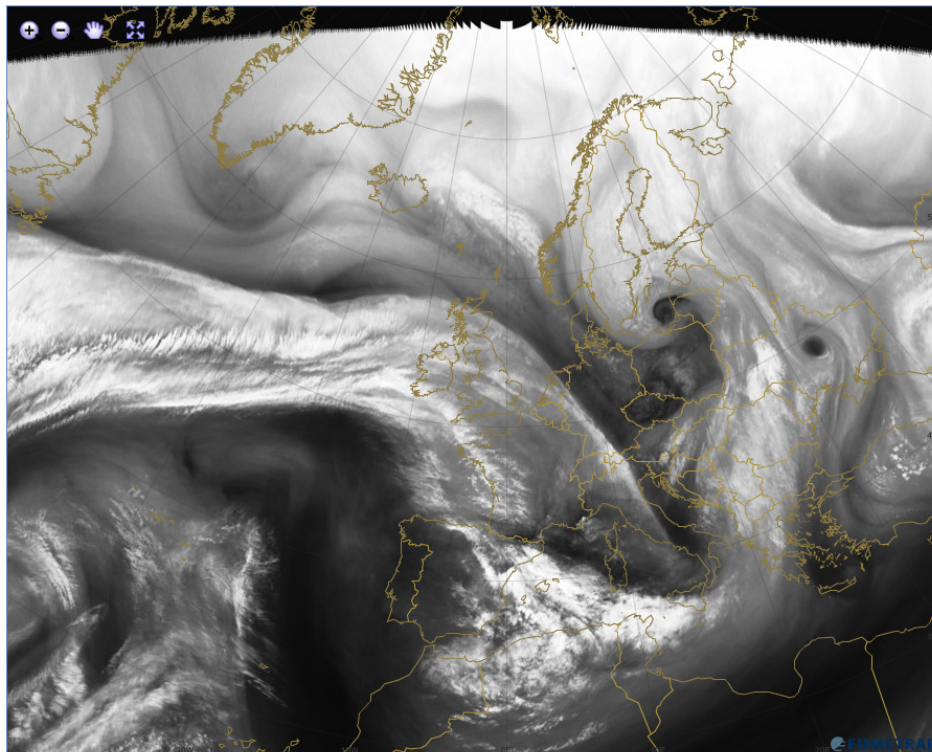
- GII
- TPW
- DIV
- MPE

Products

- SYNOP
- Opera_RADAR
- ASCAT
- JASON
- ESTOFEX
- VCS
- Vertical_Profile

The Airmass RGB vs 6.2 micron water vapour channel

6.2 micron water vapour channel



Question – what additional information does the Airmass RGB give you, compared to the 6.2 micron water vapour channel ?

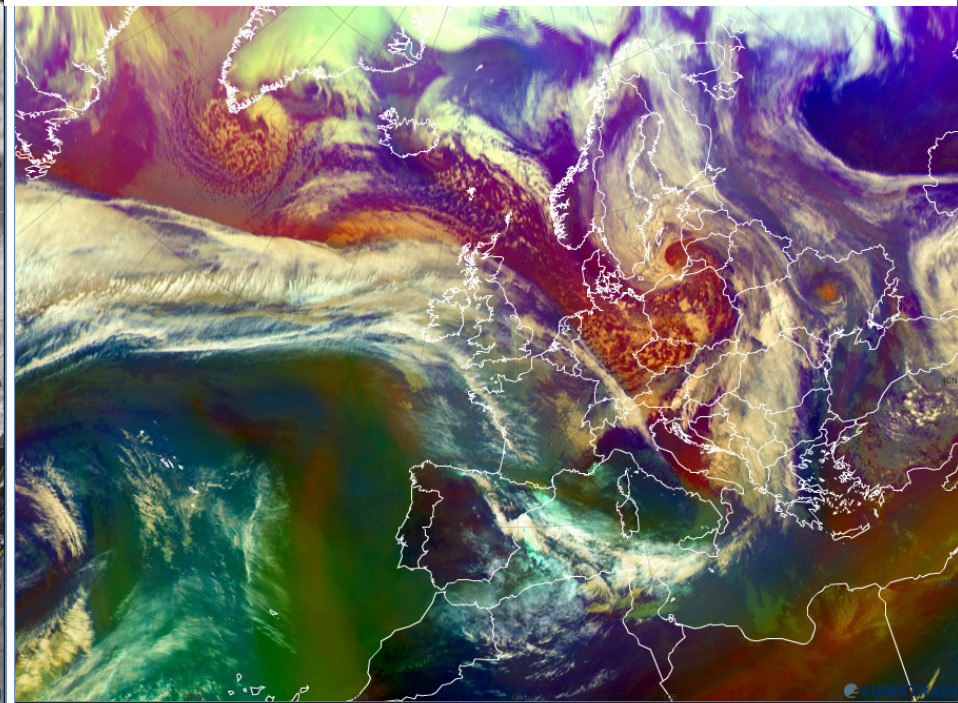
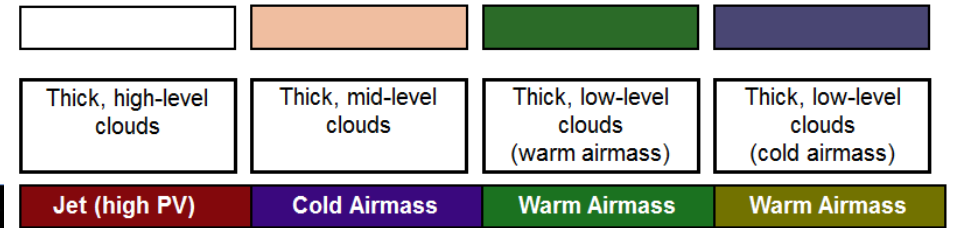
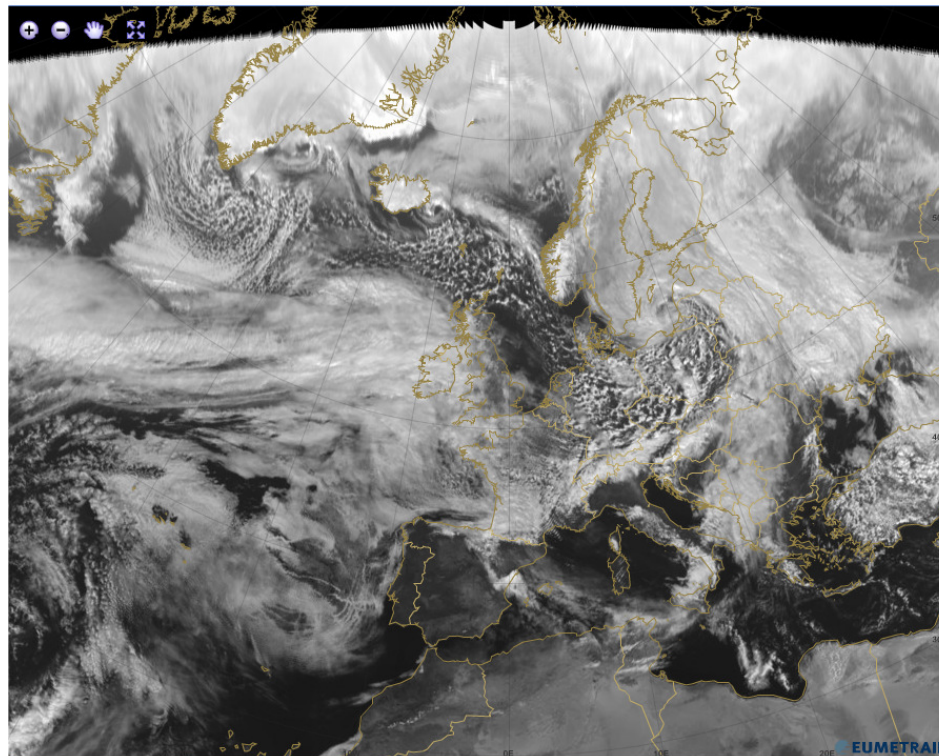
Your answer:

Question – what additional detail is the water vapour channel giving you ?

Your answer:

The Airmass RGB vs 0.6 micron visible channel

0.6 micron visible channel



Question – what additional information does the Airmass RGB give you, compared to the 0.6 micron visible channel ?

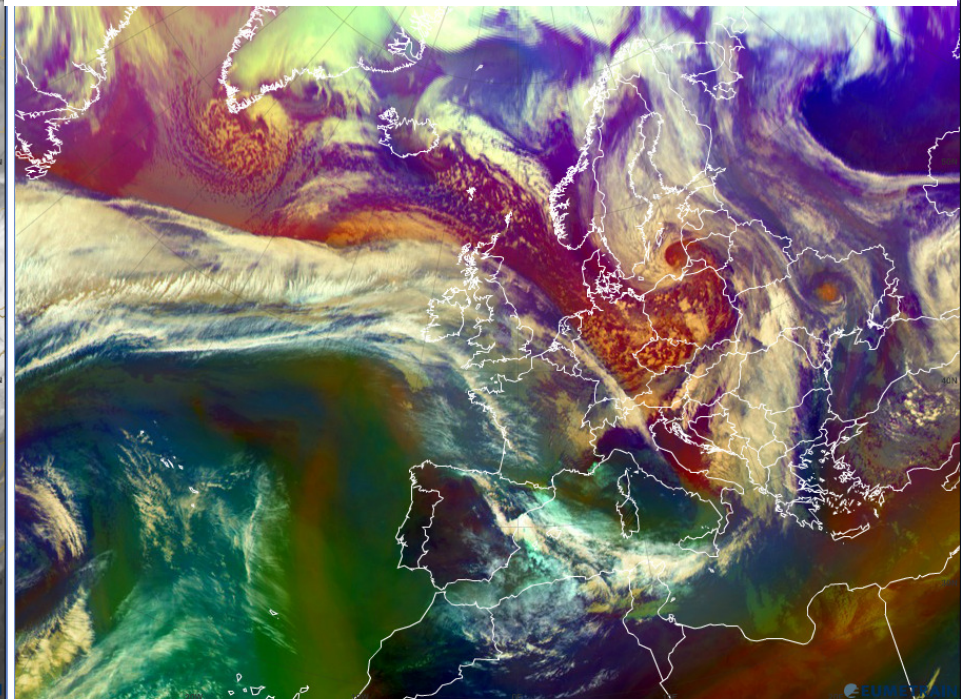
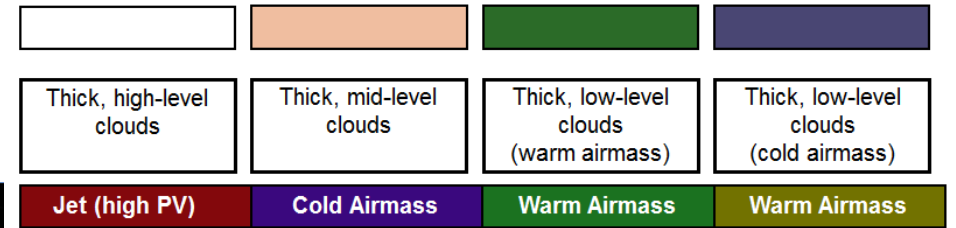
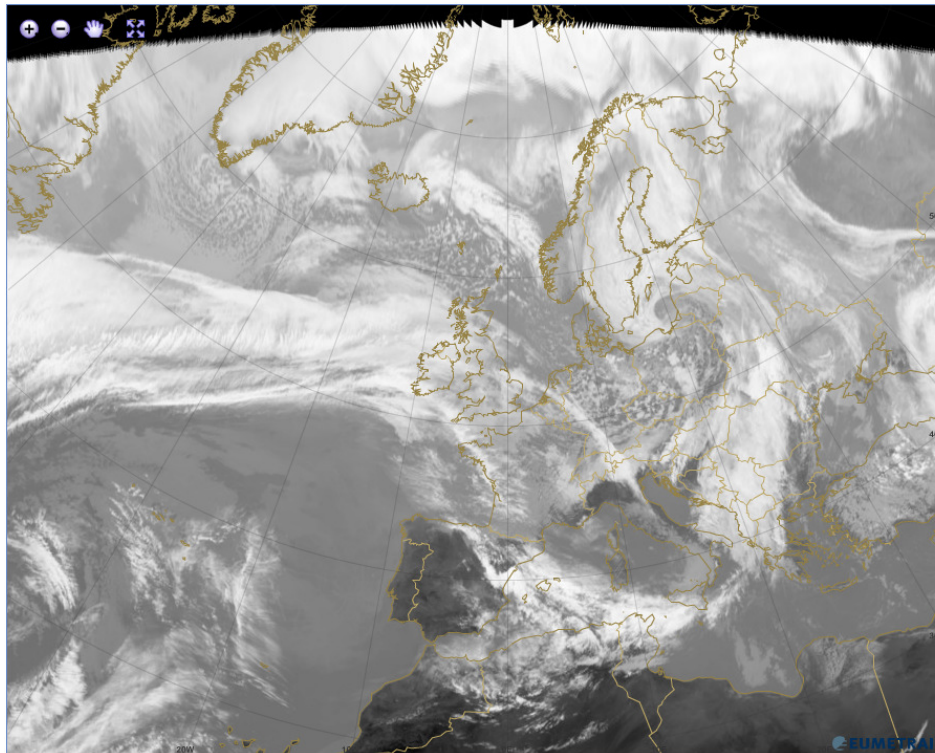
Your answer:

Question – what additional detail is the visible channel giving you ?

Your answer:

The Airmass RGB vs 10.8 micron infrared channel

10.8 micron infrared channel



Question – what additional information does the Airmass RGB give you, compared to the 10.8 micron infrared channel ?

Your answer:

Question – what additional detail is the water vapour channel giving you ?

Your answer:

image courtesy EUMETSAT

Activity: Derived Product – Cloud Type Product (NWC SAF)

(<http://www.nwcsaf.org/HD/MainNS.jsp>)

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▼ ECMWF NWP

- H300
- Streamlines300
- Isotachs300
- CVA300
- DIV300
- RV300
- Height_PV=1.5
- H500
- T500
- ThetaE500
- CVA500
- RV500
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- Equiv. Thickness
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- CAPE
- Showalter Index
- TPW
- Spec. Q-BL
- Lapse Rate
- BLH
- LCC
- Tdd
- DIV1000
- 10m. Windspeed
- 2m. Temperature
- MSLP

Legend:

- Undefined
- Fractional
- Semitransp. above
- Semitransp. thick
- Semi. meanly thick
- Semitransp. thin
- Very high opaque
- High Opaque
- Medium
- Low
- Very low
- Sea; Ice
- Land; Snow
- Sea; Cloud Free
- Land; Cloud Free
- Non-processed

▼ Meteosat Second Generation

- IR10.8
- WV6.2
- VIS0.6
- Enhanced IR10.8
- Pseudo IR
- Pseudo WV
- Airmass_RGB
- Dust RGB
- Day Microphys. RGB
- Natural Colour RGB
- HRVIS RGB
- Severe Storm RGB

▼ NWC SAF

- CT
- CTTH
- CRR
- PC
- SPhR_LPW_BL
- SPhR_LPW_ML
- SPhR_LPW_HL
- SPhR_LI

▼ MPEF

- GII
- TPW
- DIV
- MPE

▼ Products

- SYNOP
- Opera RADAR
- ASCAT
- JASON
- ESTOFEX
- VCS
- Vertical Profile

EUMETRAIN

Cloud type classification algorithm

(from <http://www.nwcsaf.org/HD/MainNS.jsp>)

The CT classification algorithm is based on the following approach:

Main cloud types are separable within two sets: the fractional and high semitransparent clouds, from the low/medium/high clouds. These two systems are distinguished using spectral features : T10.8 μ m-T12.0 μ m, T3.9 μ m-T10.8 μ m (in night-time conditions only), R0.6 μ m (in day-time conditions only), and textural features (variance T10.8 μ m coupled to variance R0.6 μ m in daytime conditions) .

Within the first set, the fractional and high semitransparent are separated mainly using their T8.7 μ m-T10.8 μ m brightness temperature differences, but also their R0.6 μ m visible reflectance (in daytime conditions only).

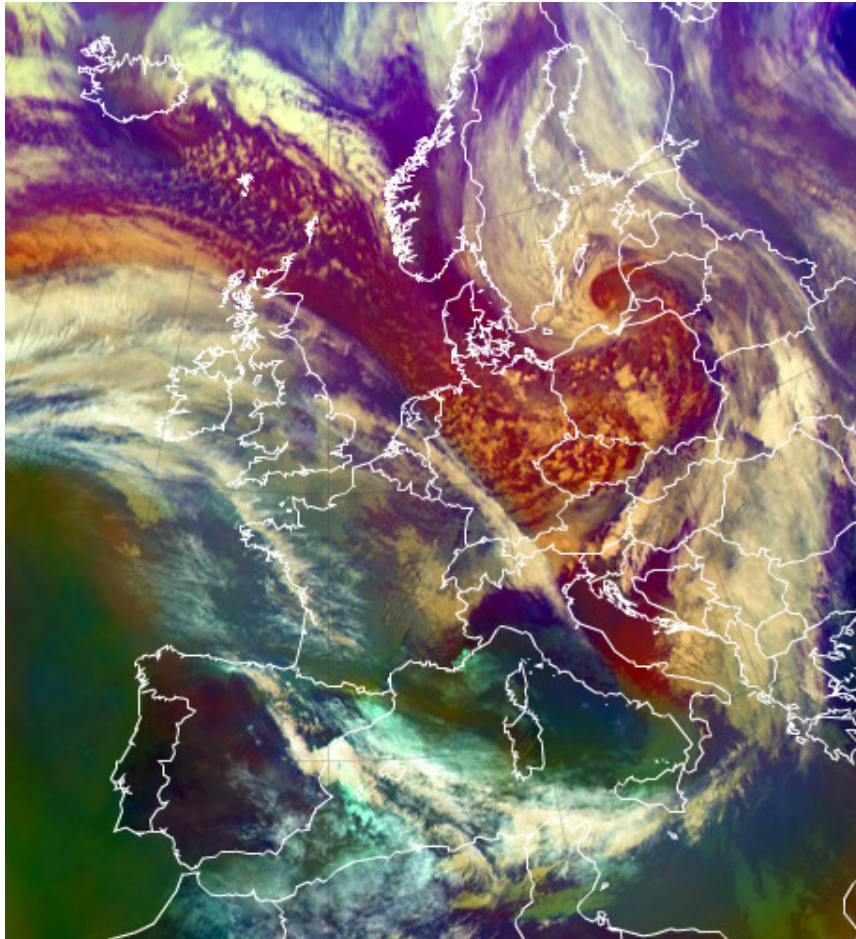
The remaining categories are distinguished through the comparison of their T10.8 μ m to NWP forecast temperatures at several pressure levels. T7.3 μ m and T8.7 μ m are also used to refine the separation between low and medium clouds, especially useful in case of low level thermal inversion.

No separation between cumuliform and stratiform clouds is performed in the current version of CT.

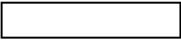



A separate processing is applied to compute a cloud phase flag, based on the use of CT cloud type, T8.7 μ m, T10.8 μ m (all illumination), R0.6 μ m and R1.6 μ m (at daytime only).

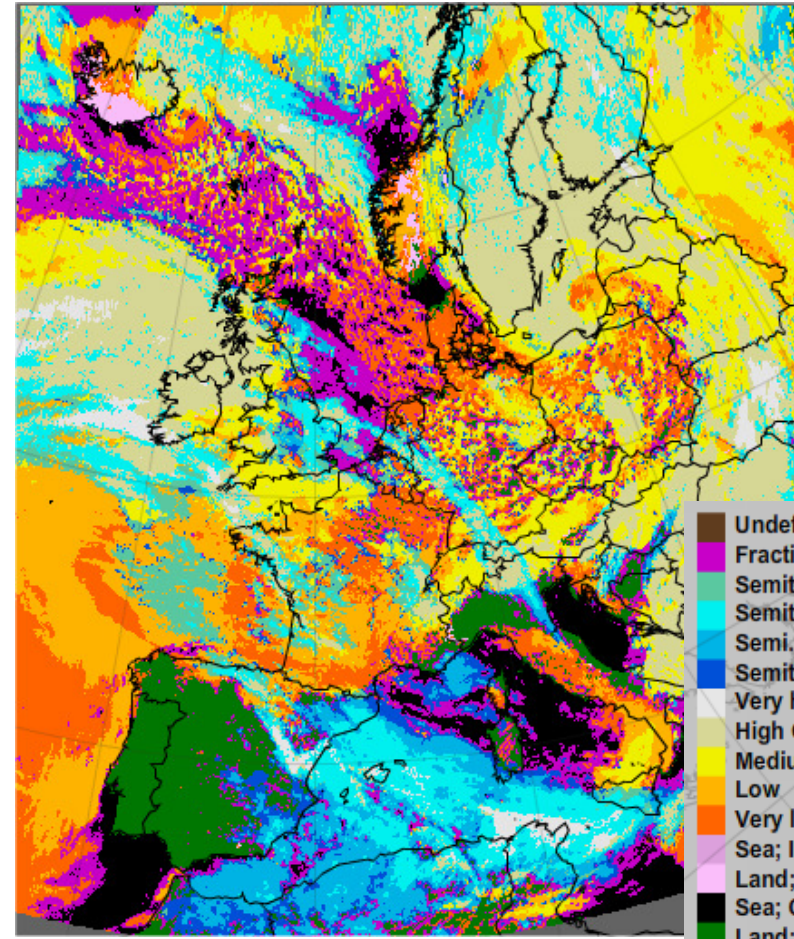
image courtesy EUMETSAT

Activity: Comparing the RGB with the Derived product



















Airmass RGB product

			
Thick, high-level clouds	Thick, mid-level clouds	Thick, low-level clouds (warm airmass)	Thick, low-level clouds (cold airmass)
Jet (high PV)	Cold Airmass	Warm Airmass	Warm Airmass



CT Derived Product

	Undefined
	Fractional
	Semitransp. above
	Semitransp. thick
	Semi. meanly thick
	Semitransp. thin
	Very high opaque
	High Opaque
	Medium
	Low
	Very low
	Sea; Ice
	Land; Snow
	Sea; Cloud Free
	Land; Cloud Free
	Non-processed

Question: Give one advantage of the RGB product. Give one advantage of the Derived Product.

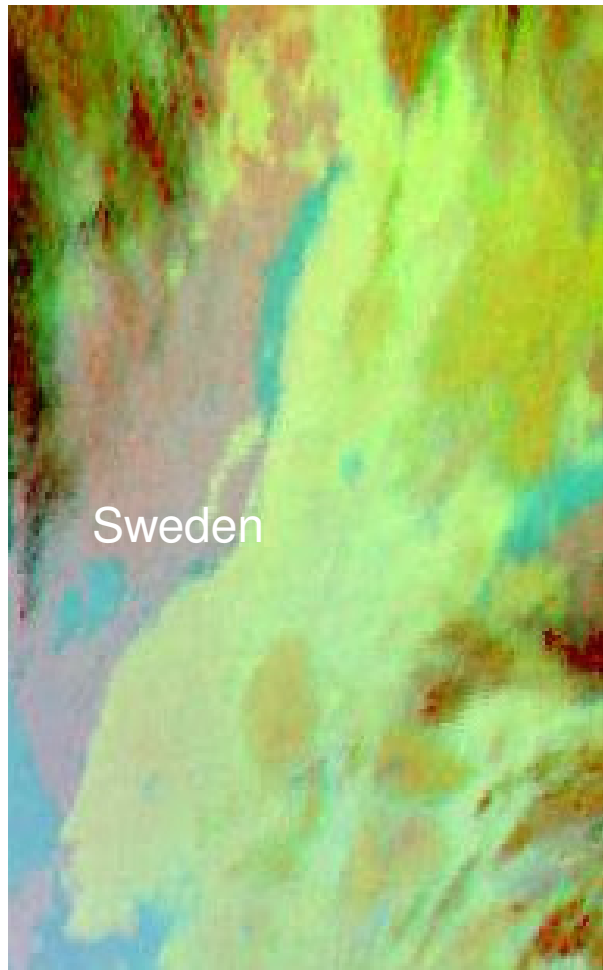
Question – Advantages and disadvantages of Derived Products over RGB products

Advantages of Derived Products over RGB products	Disadvantages of Derived Products over RGB products

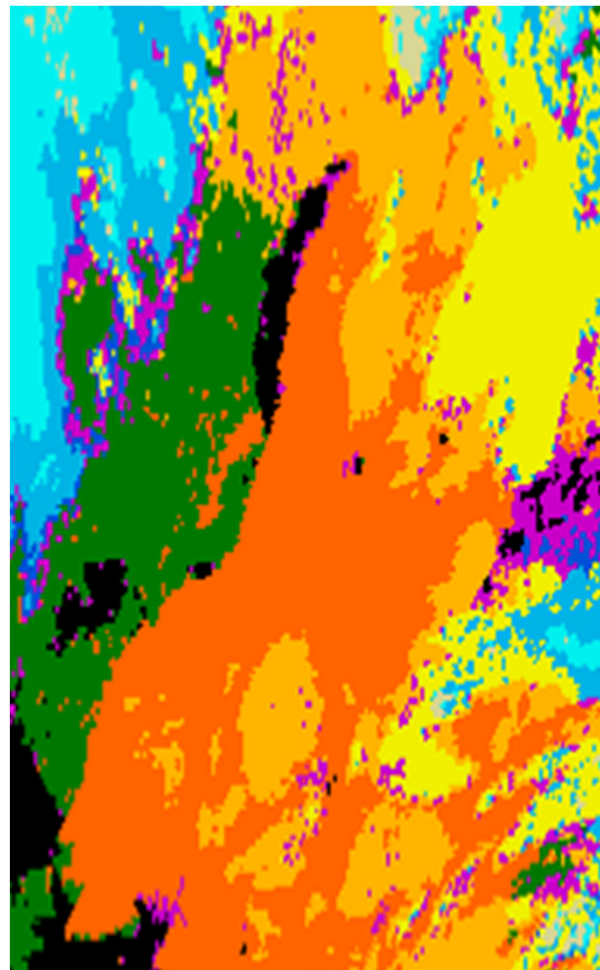
Answers – Advantages and disadvantages of Derived Products over RGB products

Advantages of Derived Products over RGB products	Disadvantages of Derived Products over RGB products
<p>1 – this data can be calibrated to assist people with colour blindness</p> <p>2 – less subjective</p> <p>3 – better for climatology studies</p> <p>4 – not affected by viewing angle – good at all latitudes.</p> <p>5 – products can be produced that focus upon particular properties.</p>	<p>1 – loss of texture of the cloud</p> <p>2 – takes time to compute this – generated later</p> <p>3 – dependent on NWP and other ancillary information</p> <p>4 – difficult to animate (often noisy)</p> <p>5 – not so good for detecting cloud boundaries and thin cloud (thin fog)</p> <p>6 – reduced horizontal and vertical resolution</p>

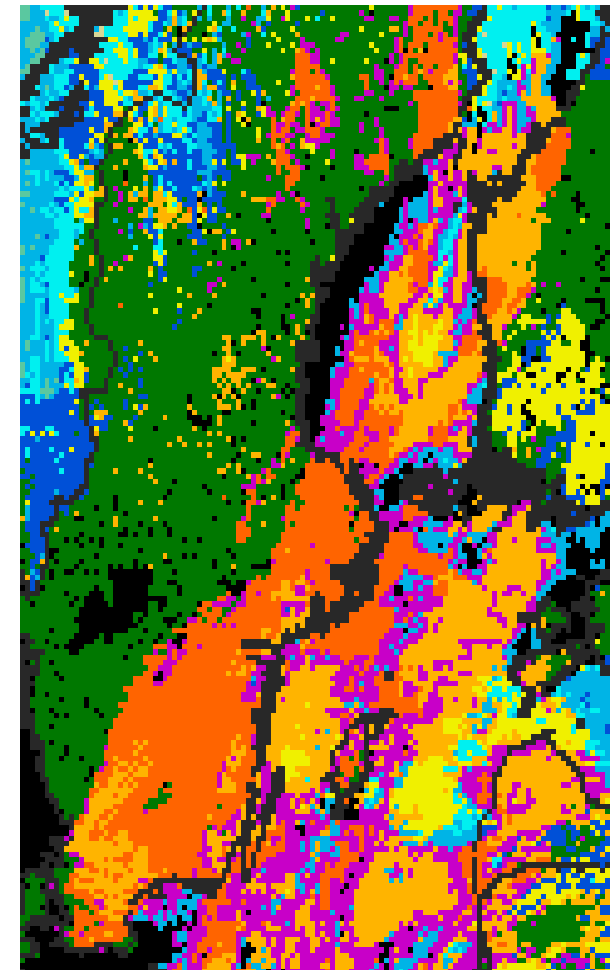
Variations in the Derived Product (Cloud Type) due to different satellite sensors compared to the 24-hours Microphysics RGB



24-h Microphys. RGB



Cloud Type (MSG, SMHI)

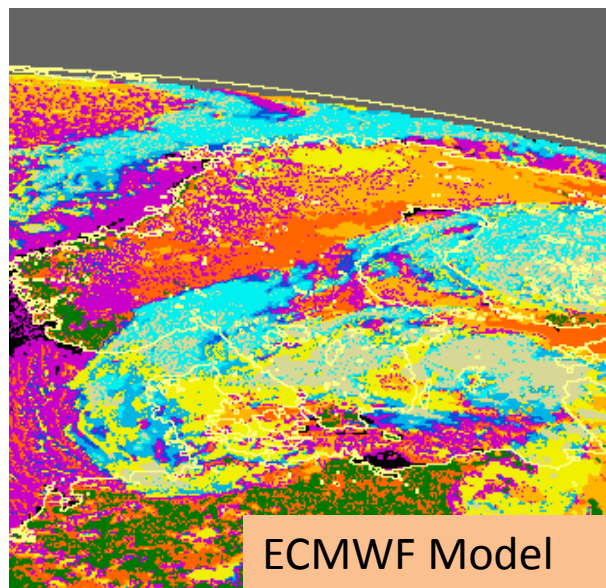
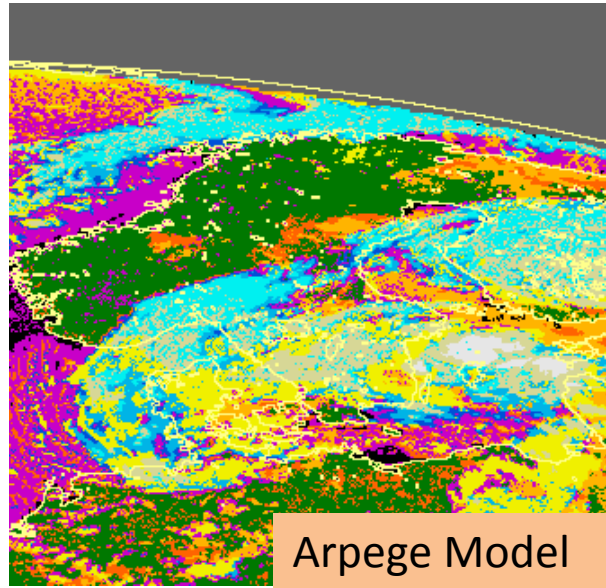
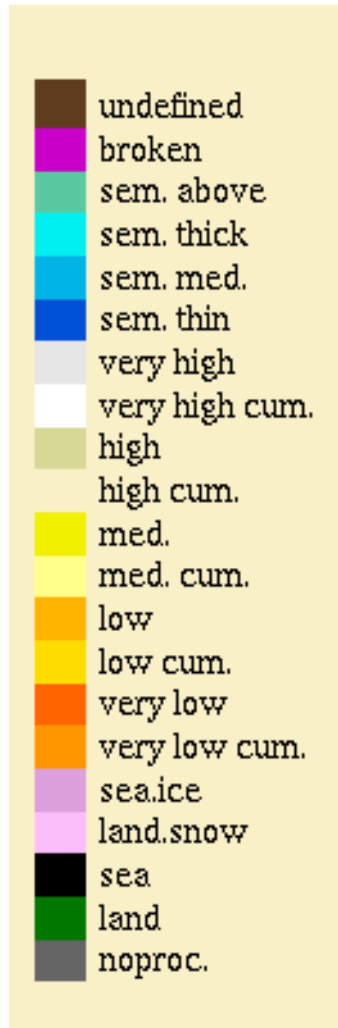


Cloud Type (NOAA, SMHI)

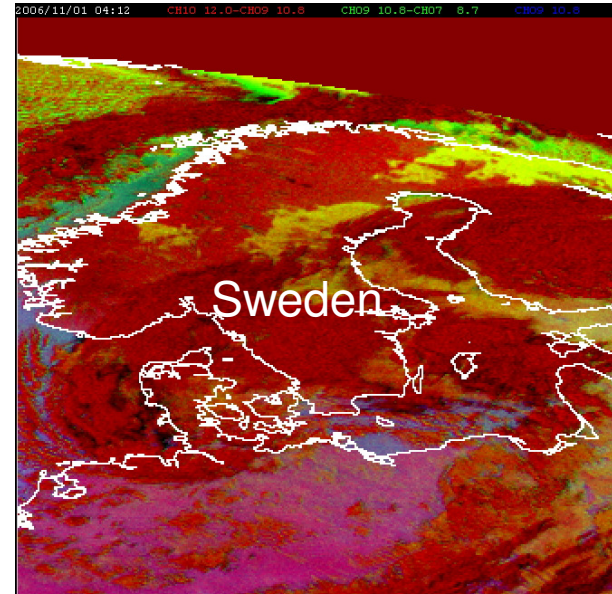
Met-8, 1 Feb 2007, 01:30 UTC; NOAA-18, 1 Feb 2007, 1:22 UTC

Variations in the Derived Product (Cloud Type) due to different NWP algorithms

Cloud Type Products



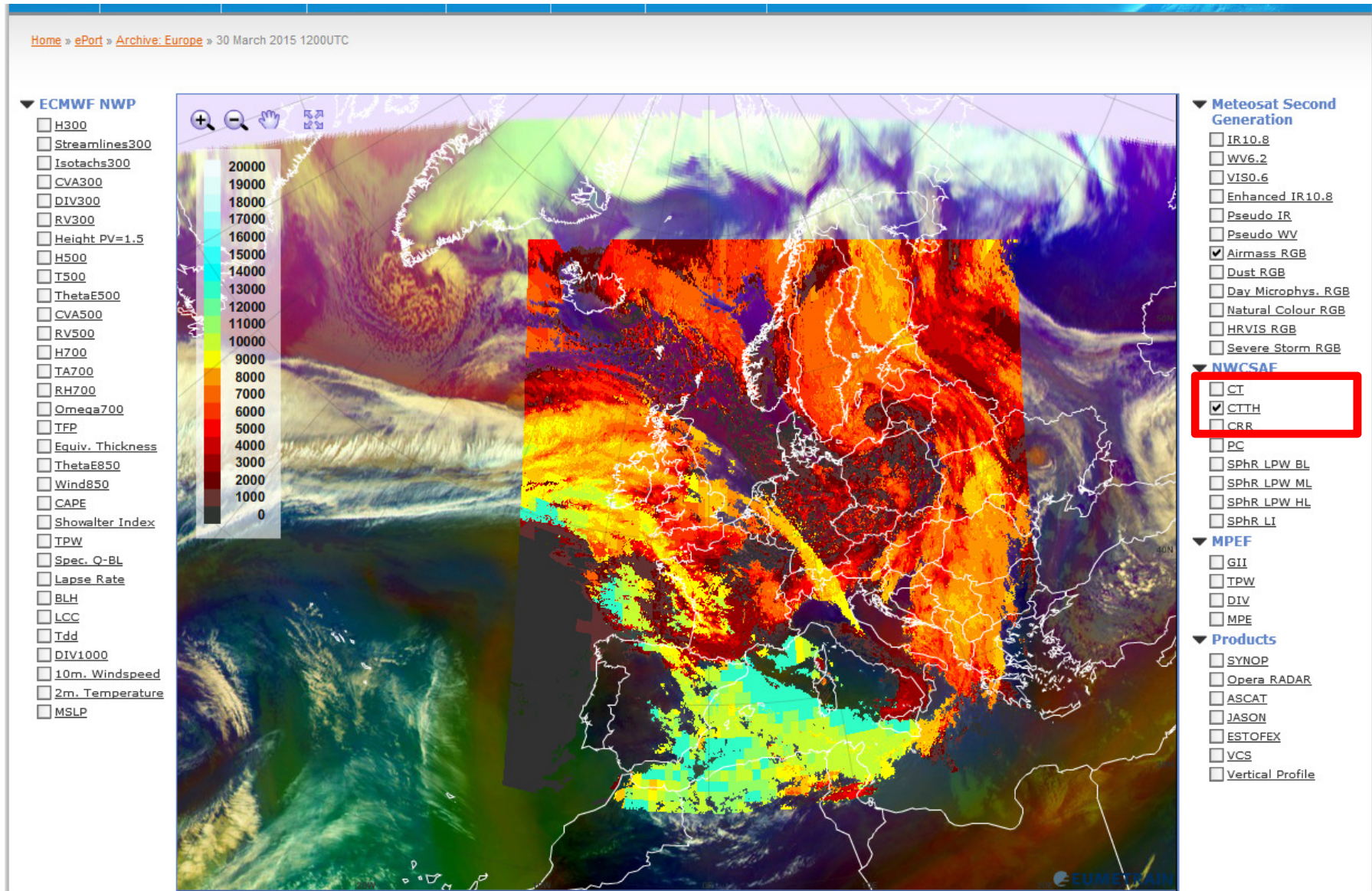
24-h Micro RGB



1 November 2006, 4:00 UTC

Slide from "RGB Products versus Derived Products" Dr. Jochen Kerkmann, presented at WMO EUMETSAT RGB Satellite Products Workshop 2012

Activity: Overlaying Derived Products – Cloud Top Temperature and Height



Cloud Top Temperature and Height (CTTH) Derived Product algorithm summary description (1)

(from <http://www.nwcsaf.org/HD/MainNS.jsp>)

Note that Himawari-8 Cloud Property Applications for Visual Weather includes **Cloud Top Temperature and Cloud Top Height** derived product.

Process of producing this derived product:

- RTTOV radiative transfer model is applied using NWP temperature and humidity vertical profile to simulate 6.2 μm , 7.3 μm , 13.4 μm , 10.8 μm , and 12.0 μm cloud free and overcast radiances and brightness temperatures.
- The vertical profiles used are temporally interpolated to the exact slot time using the two nearest in time NWP fields input by the user.
- A number of techniques are then used to retrieve the cloud top pressure This depends on the cloud type as derived from the Cloud Type (CT) derived product.
- Cloud top temperature and height (above sea level) is then computed from the pressure.

Cloud Top Temperature and Height (CTTH) Derived Product algorithm summary description (2)

(from <http://www.nwcsaf.org/HD/MainNS.jsp>)

Process of producing this derived product (continued):

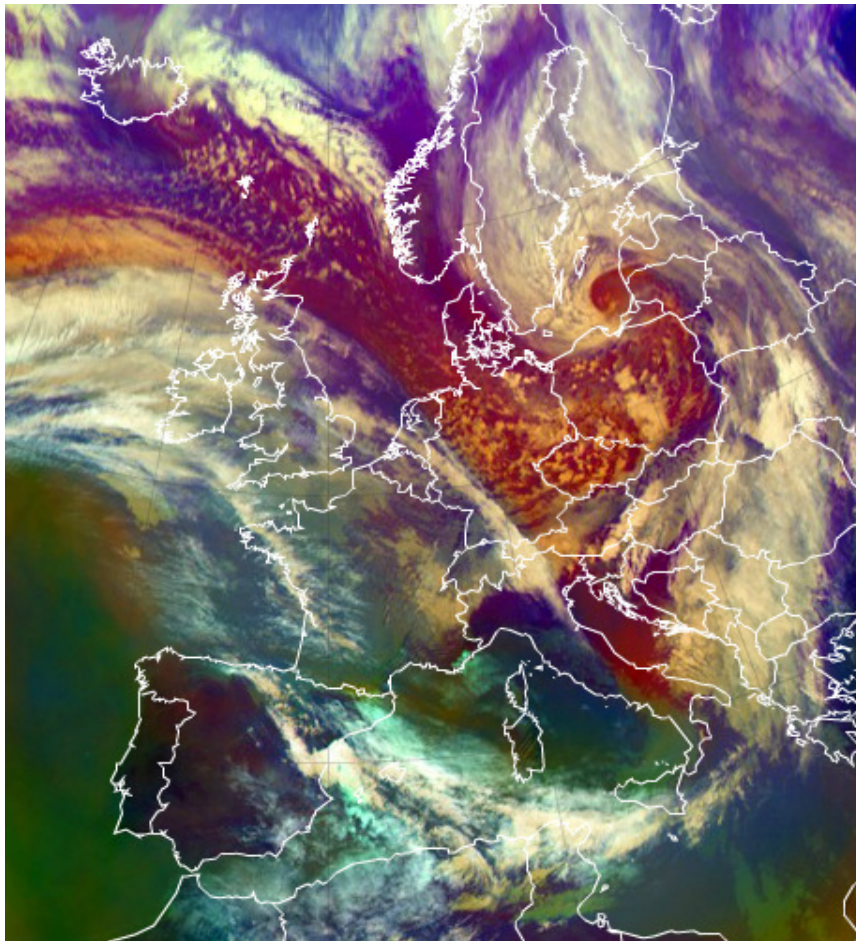
- Effective cloudiness (defined as the fraction of the field of view covered by the cloud (the cloud amount) multiplied by the cloud emissivity in the 10.8 μ m window channel) is also computed during the processing. It is equal to 1.0 for thick clouds and takes a value between 0.0 and 1.0 for semi-transparent clouds.

Use of the product:

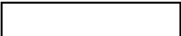



- This product contributes to the analysis and early warning of thunderstorm development.
- Other applications include the cloud top height assignment for aviation forecast activities.
- The product may also be used as input to mesoscale models or to other SAF NWC product generation elements.
- Validation has been performed only in the European Area.

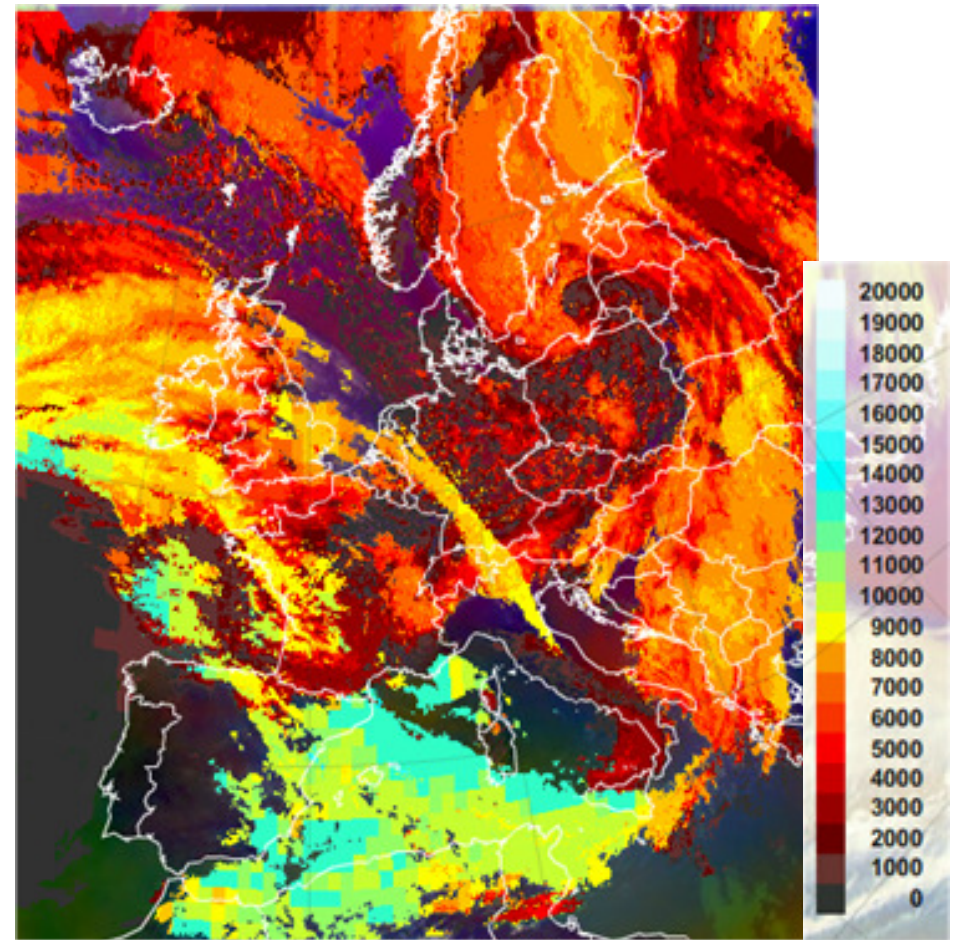
image courtesy EUMETSAT

Activity: Comparing the RGB with the Derived product



Airmass RGB product

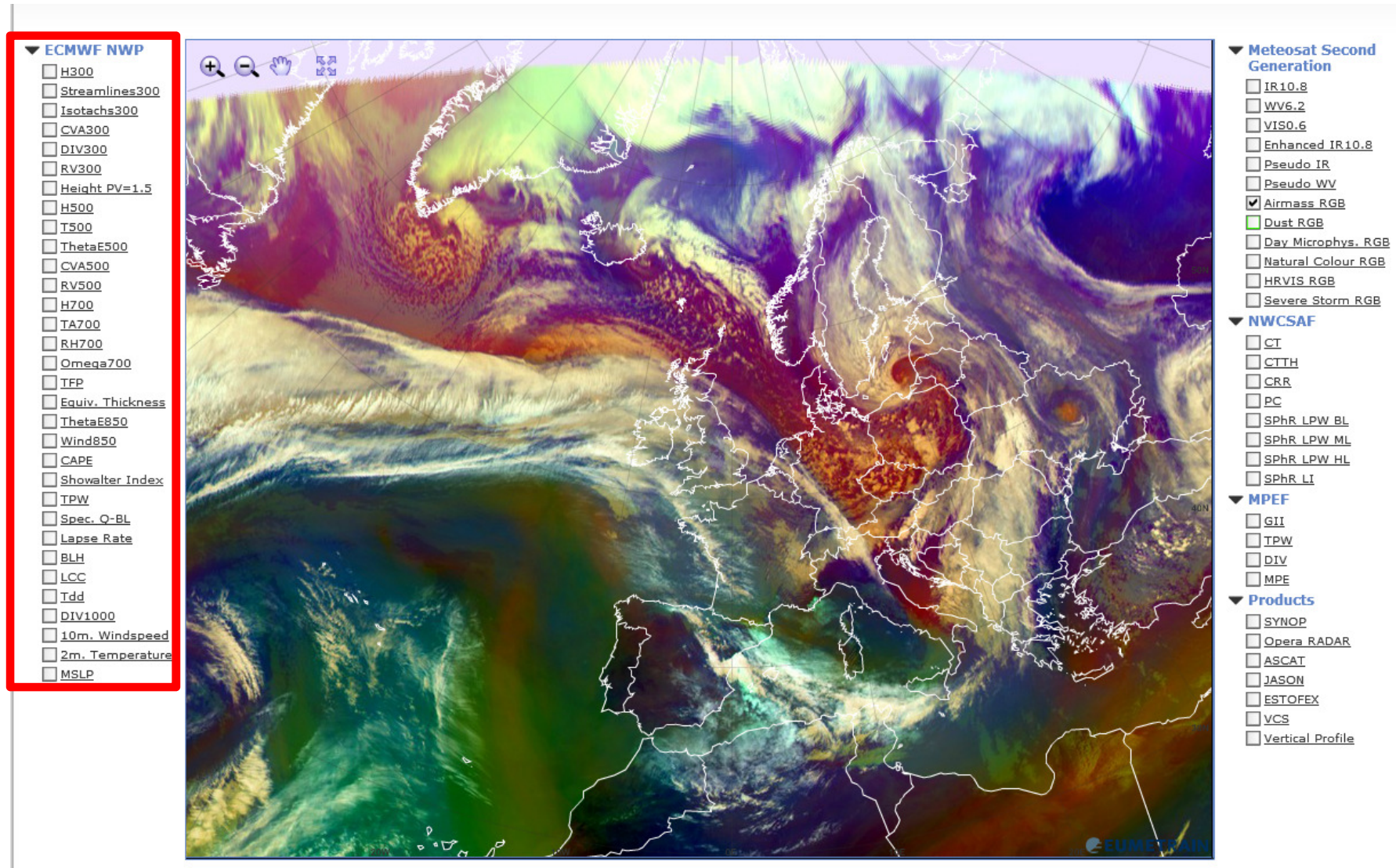
			
Thick, high-level clouds	Thick, mid-level clouds	Thick, low-level clouds (warm airmass)	Thick, low-level clouds (cold airmass)
Jet (high PV)	Cold Airmass	Warm Airmass	Warm Airmass



CTTH Derived Product

Question: Give one advantage of the RGB product. Give one advantage of the Derived Product.

Activity: Exploring NWP



Activity: please explore the ECMWF NWP fields and indicate which of these NWP fields capture the key features identified in the Airmass RGB product

image courtesy EUMETSAT

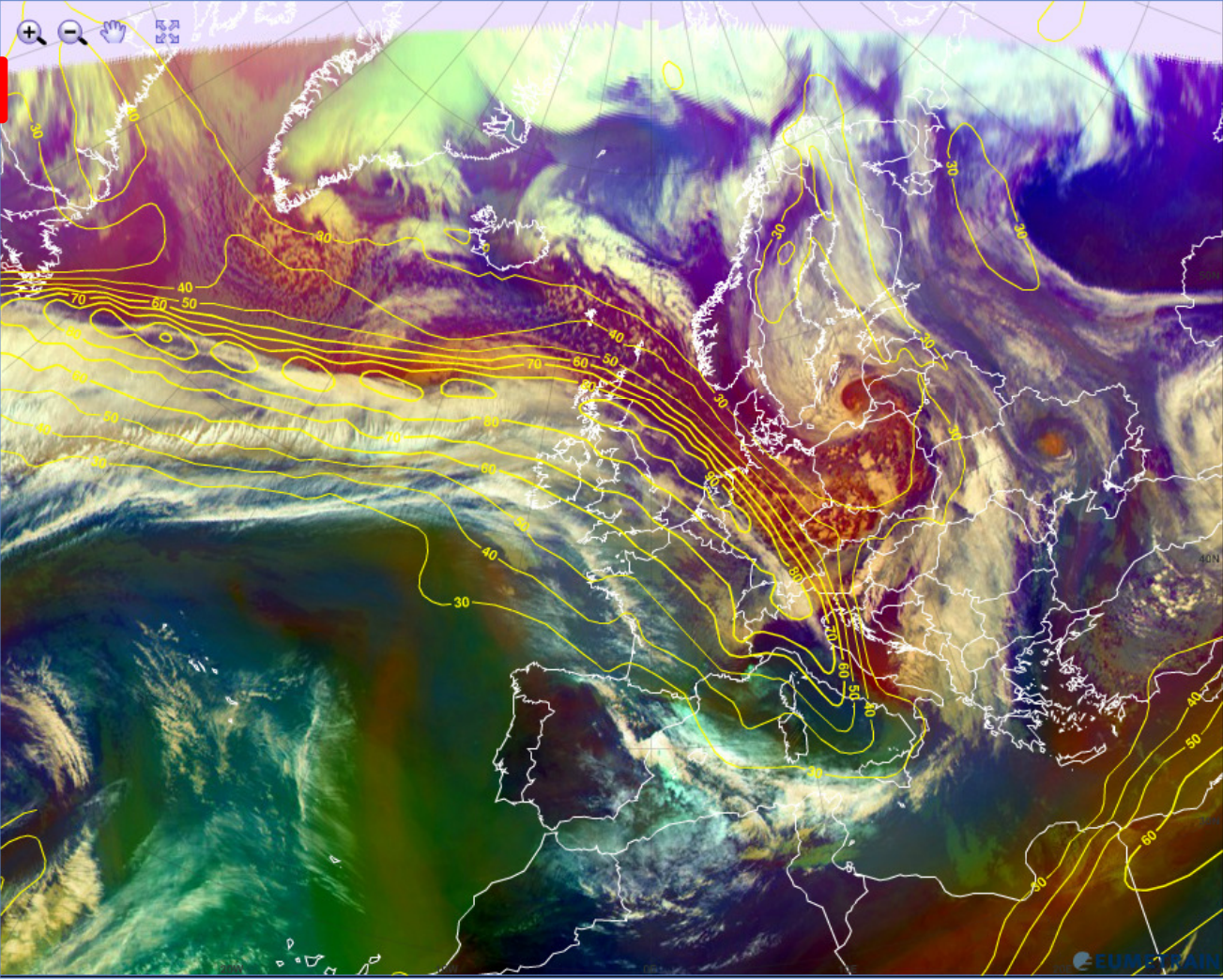
Recommended answer: Airmass RGB and Isotachs 300hPa

Home Resources ePort User Manual Courses Events Polarstern

Home » ePort » Archive: Europe » 30 March 2015 1200UTC

▼ ECMWF NWP

- H300
- Isotachs300
- CVA300
- DIV300
- RV300
- Height PV=1.5
- H500
- T500
- ThetaE500
- CVA500
- RV500
- H700
- TA700
- RH700
- Omega700
- TFP
- Equiv. Thickness
- ThetaE850
- Wind850
- CAPE
- Showalter Index
- TPW
- Spec. Q-BL
- Lapse Rate
- BLH
- LCC
- Tdd
- DIV1000
- 10m. Windspeed
- 2m. Temperature
- MSLP



▼ Meteosat Second Generation

- IR10.8
- WV6.2
- VIS0.6
- Enhanced IR10.8
- Pseudo IR
- Pseudo WV
- Airmass RGB
- Dust RGB
- Day Microphys. RGB
- Natural Colour RGB
- HRVIS RGB
- Severe Storm RGB

▼ NWCSAF

- CT
- CTH
- CRR
- PC
- SPhR LPW BL
- SPhR LPW ML
- SPhR LPW HL
- SPhR LI

▼ MPEF

- GII
- TPW
- DIV
- MPE

▼ Products

- SYNOP
- Opera RADAR
- ASCAT
- JASON
- ESTOFEX
- VCS
- Vertical Profile

image courtesy EUMETSAT

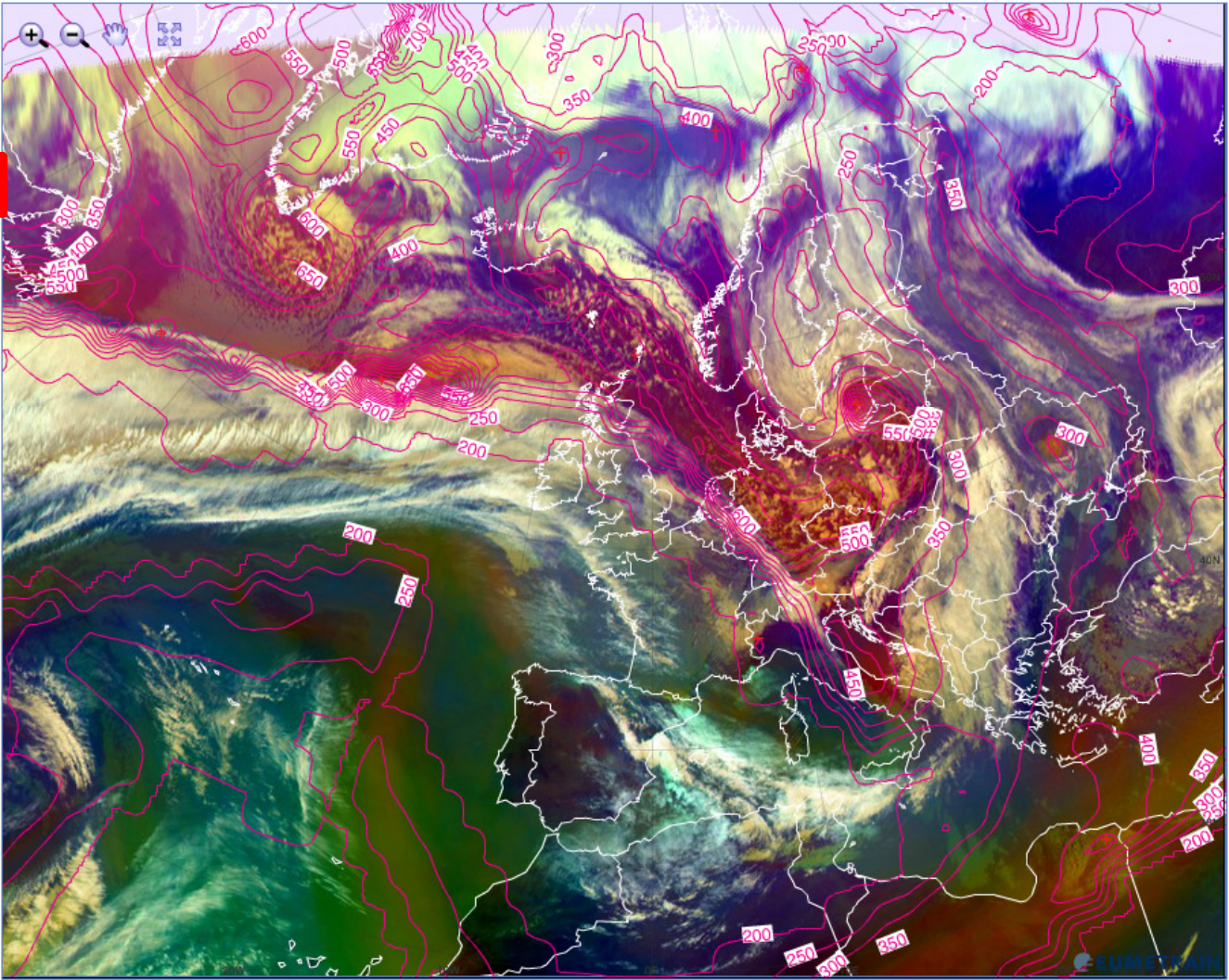
Recommended answer: Airmass RGB and Height PV=1.5

Home Resources ePort User Manual Courses Events Polarstern

Home » ePort » Archive: Europe » 30 March 2015 1200UTC

ECMWF NWP

- H300
- Streamlines300
- Isotachs300
- CVA300
- DIV300
- Height PV=1.5
- H500
- T500
- ThetaE500
- CVA500
- RV500
- H700
- TA700
- RH700
- Omega700
- IFP
- Equiv. Thickness
- ThetaE850
- Wind850
- CAPE
- Showalter Index
- TPW
- Spec. Q-BL
- Lapse Rate
- BLH
- LCC
- Tdd
- DIV1000
- 10m. Windspeed
- 2m. Temperature
- MSLP



Meteosat Second Generation

- IR10.8
- WV6.2
- VIS0.6
- Enhanced IR10.8
- Pseudo IR
- Pseudo WV
- Airmass RGB
- Dust RGB
- Day Microphys. RGB
- Natural Colour RGB
- HRVIS RGB
- Severe Storm RGB

NWCSAF

- CT
- CTTH
- CRR
- PC
- SPhR LPW BL
- SPhR LPW ML
- SPhR LPW HL
- SPhR LI

MPEF

- GII
- TPW
- DIV
- MPE

Products

- SYNOP
- Opera RADAR
- ASCAT
- JASON
- ESTOFEX
- VCS
- Vertical Profile

image courtesy EUMETSAT

Case Study 2: Day Convection RGB

<http://eumetrain.org/eport.html>

The screenshot displays the EUMETRAIN website interface. At the top right, there are links for "About us" and "Contact us". The main navigation bar includes "Home", "Resources", "ePort", "User Manual", and "Polarstern". The "ePort" menu is open, showing a list of regions: Europe, South-Africa, Middle-East, Polar, and Atlantic. The "Archive: Europe" option is highlighted with a red box. Below the menu, the "Concept of ePort" section explains that ePort is a product of EUMeT that combines rare satellite images with satellite numerical model fields. It also mentions that images are stored in an archive for qualitative research. On the right side, there is a satellite image of Earth showing convection patterns, with a timestamp of "09:15" and an "INFO" button at the bottom left of the image area.

Home » ePort

ePort

Concept of ePort

ePort is a product of EUMeT that allows you to combine a rare satellite images with satellite numerical model fields.

At the moment ePort provides four panels allowing

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

- Europe
- South-Africa
- Middle-East
- Polar
- Atlantic
- Archive: Europe**
- Archive: South-Africa
- Archive: Middle-East
- Archive: Polar
- Archive: Atlantic

09:15

INFO

Activity: Exploring EUMETRAIN ePort – 19 September 2014

The screenshot shows the EUMETRAIN ePort website interface. At the top, there is a navigation bar with links for Home, Resources, ePort, User Manual, Courses, Events, and Polarstern. Below the navigation bar, the breadcrumb trail reads "Home » ePort » Archive: Europe". The main heading is "Archive: Europe".

On the left side, there is a satellite image titled "Meteosat 10 Airmass RGB - 19 September 2014: 1200UTC". A white text box is overlaid on the image with the text "Choose 19 September 2014 1200UTC".

On the right side, there is a date selection dropdown menu. The menu is open, showing a list of dates and times. The date "19 September 2014: 1200UTC" is highlighted with a red box. Below the dropdown menu, there are two orange arrows pointing up and down, and a red box containing the text "GO!". To the right of the "GO!" button, the text "Then 'GO'" is written.

... Select a date

- 22 September 2014: 0000UTC
- 21 September 2014: 1800UTC
- 21 September 2014: 1200UTC
- 21 September 2014: 0600UTC
- 21 September 2014: 0000UTC
- 20 September 2014: 1800UTC
- 20 September 2014: 1200UTC
- 20 September 2014: 0600UTC
- 20 September 2014: 0000UTC
- 19 September 2014: 1800UTC
- 19 September 2014: 1200UTC**
- 19 September 2014: 0600UTC
- 19 September 2014: 0000UTC
- 18 September 2014: 1800UTC
- 18 September 2014: 1200UTC
- 18 September 2014: 0600UTC
- 18 September 2014: 0000UTC
- 17 September 2014: 1800UTC
- 17 September 2014: 1200UTC
- 17 September 2014: 0600UTC
- 17 September 2014: 0000UTC
- 16 September 2014: 1800UTC
- 16 September 2014: 1200UTC
- 16 September 2014: 0600UTC
- 16 September 2014: 0000UTC
- 15 September 2014: 1800UTC
- 15 September 2014: 1200UTC
- 15 September 2014: 0600UTC

Then "GO"

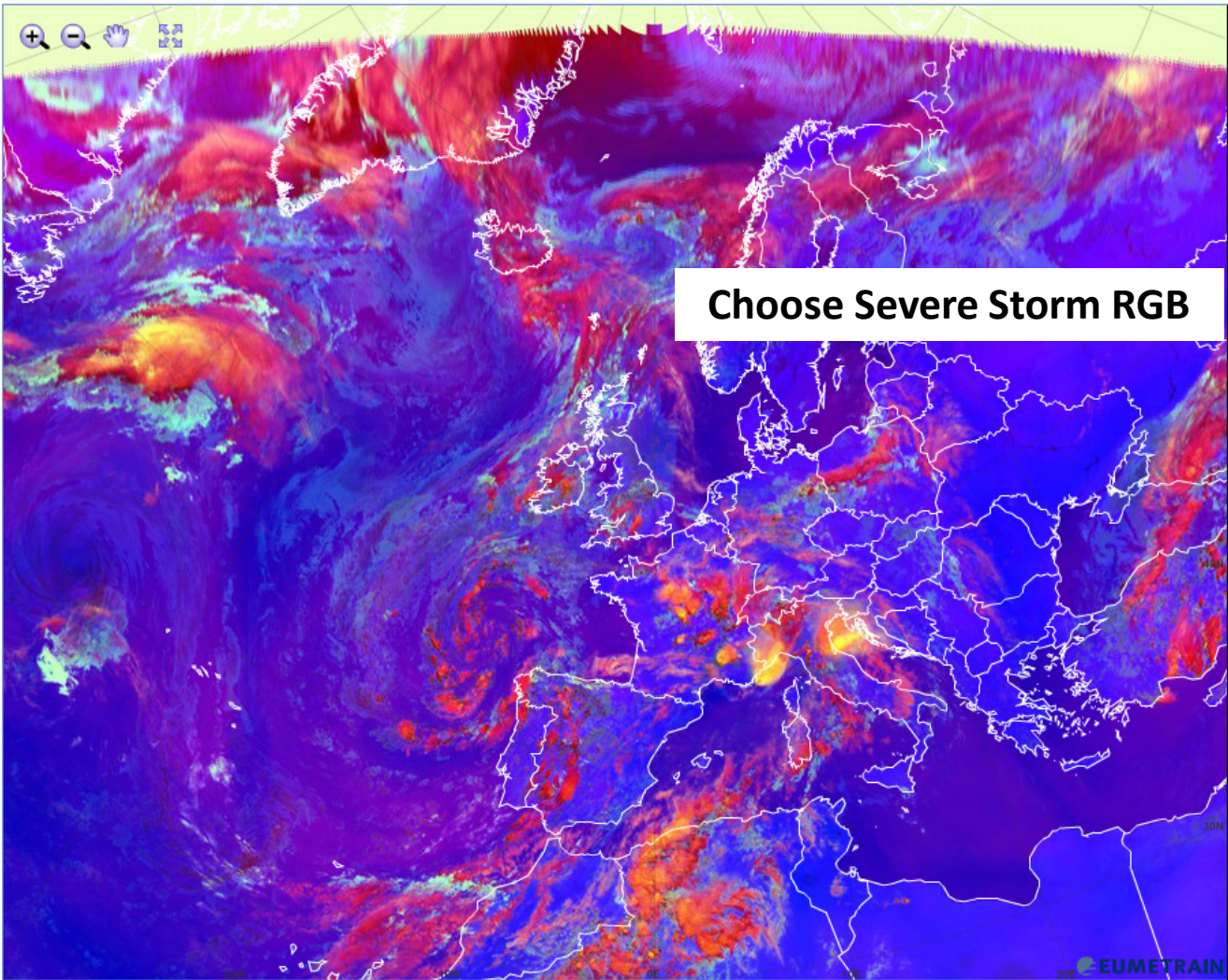
GO!

Activity: Exploring EUMETRAIN ePort

Home » ePort » Archive: Europe » 19 September 2014 1200UTC

▼ ECMWF NWP

- H300
- Streamlines300
- Isotachs300
- CVA300
- DIV300
- RV300
- Height PV=1.5
- H500
- T500
- ThetaE500
- CVA500
- RV500
- H700
- TA700
- RH700
- Omega700
- TFP
- Equiv. Thickness
- ThetaE850
- Wind850
- CAPE
- Showalter Index
- TPW
- Spec. Q-BL
- Lapse Rate
- BLH
- LCC
- Tdd
- DIV1000
- 10m. Windspeed
- 2m. Temperature
- MSLP



Choose Severe Storm RGB

▼ Meteosat Second Generation

- IR10.8
- WV6.2
- VIS0.6
- Enhanced IR10.8
- Pseudo IR
- Pseudo WV
- Airmass RGB
- Dust RGB
- Day Microphys. RGB
- Natural Colour RGB
- UVVIS RGB
- Severe Storm RGB
- CT
- CTTH
- CRR
- PC
- SPhR LPW BL
- SPhR LPW ML
- SPhR LPW HL
- SPhR LI

▼ MPEF

- GII
- TPW
- DIV
- MPE

▼ Products

- SYNOP
- Opera RADAR
- ASCAT
- JASON
- ESTOFEX
- VCS
- Vertical Profile

EUMETRAIN

Activity: Exploring EUMETRAIN ePort

The screenshot displays the EUMETRAIN ePort interface in a Mozilla Firefox browser window. The main content area shows a satellite image titled "Severe Storm RGB" with a descriptive text block and a detailed legend. The legend identifies four cloud types: "Thin ice cloud Large iceparticles", "Thick ice cloud Large iceparticles", and "Thick ice cloud Small iceparticles". To the right, a configuration panel for "Meteosat Second Generation" is visible, with the "Severe Storm RGB" option checked and highlighted by a red box and arrow. Below the main image, a secondary image shows a different view of the same data, and a list of other data layers is provided at the bottom left.

Severe Storm RGB

The Severe Convection RGB is suitable for the detection of convection and it is able to discriminate between young and old convective cells.

Especially for convective situations you would like to monitor this RGB. If you see cold cloudtops (IR10.8) in combination with the yellow colours you can be certain that the cell is associated to severe updrafts and fierce weather!

Meteosat 8 - Severe Storm RGB: 6 November 2004 1200UTC

- Thin ice cloud Large iceparticles
- Thick ice cloud Large iceparticles
- Thick ice cloud Small iceparticles

Meteosat Second Generation

- IR10.8
- WV6.2
- VIS0.6
- Enhanced IR10.8
- Pseudo IR
- Pseudo WV
- Airmass RGB
- Dust RGB
- Day Microphys. RGB
- Natural Colour RGB
- UV0.6 RGB
- Severe Storm RGB

MPEF

- GII
- TPW
- DIV
- MPE

Tdd

DIV1000

10m. Windspeed

2m. Temperature

MSLP

Click on title to obtain further information about the data you have chosen

EUMETRAIN

image courtesy EUMETSAT

Activity: Derived Product – Cloud Type Product (NWC SAF)

(<http://www.nwcsaf.org/HD/MainNS.jsp>)

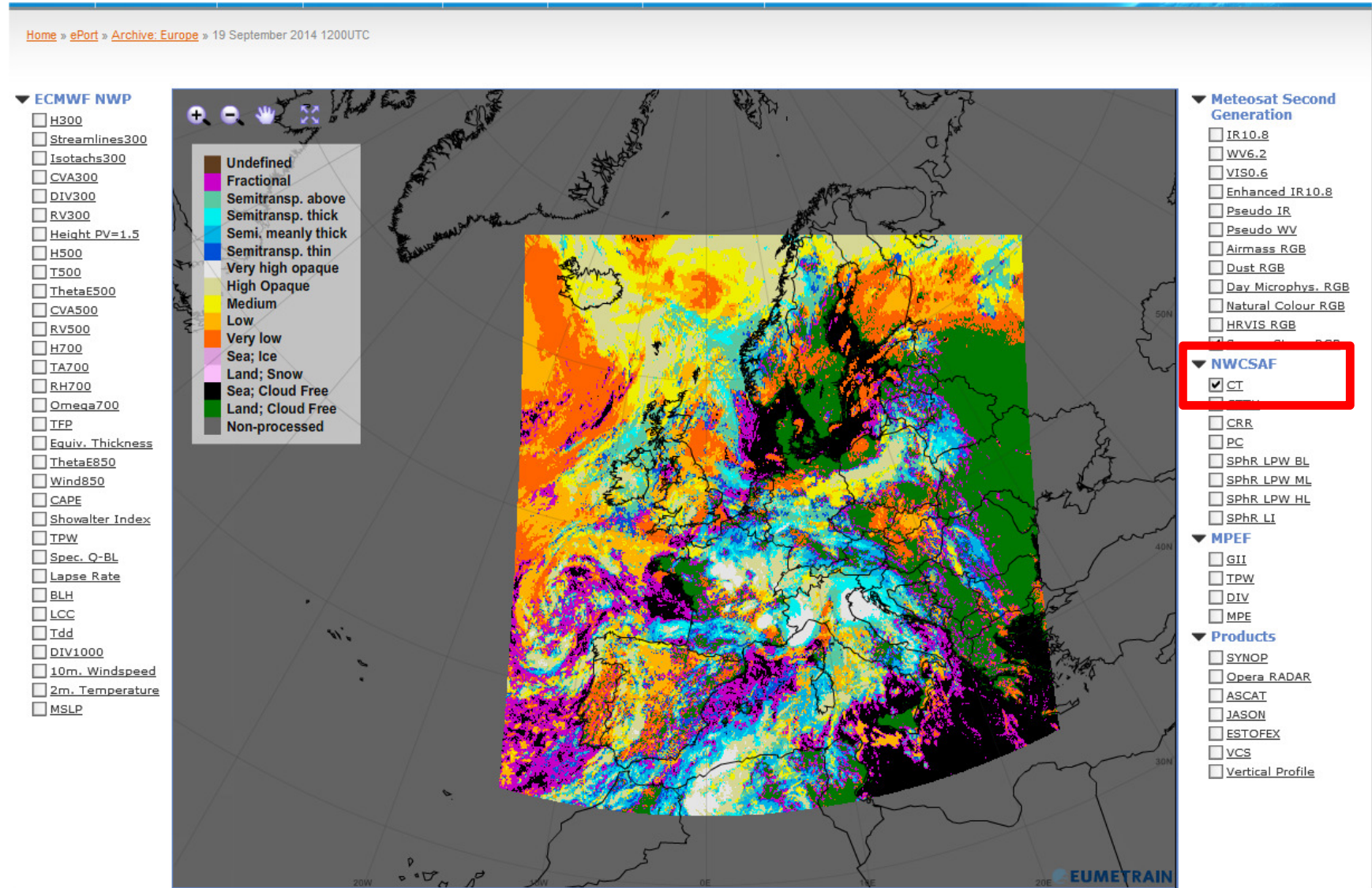


image courtesy EUMETSAT

Activity: Overlaying Derived Products – Cloud Top Temperature and Height

Home » ePort » Archive: Europe » 19 September 2014 1200UTC

ECMWF NWP

- H300
- Streamlines300
- Isotachs300
- CVA300
- DIV300
- RV300
- Height PV=1.5
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- ThetaE500
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- BLH
- LCC
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- 2m. Temperature
- MSLP

Meteosat Second Generation

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- WV6.2
- VIS0.6
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- HRVIS RGB
- Severe Storm RGB

NWCSAF

- CT
- CTTH
- CRR
- PC
- SPhR LPW BL
- SPhR LPW ML
- SPhR LPW HL
- SPhR LI

MPEF

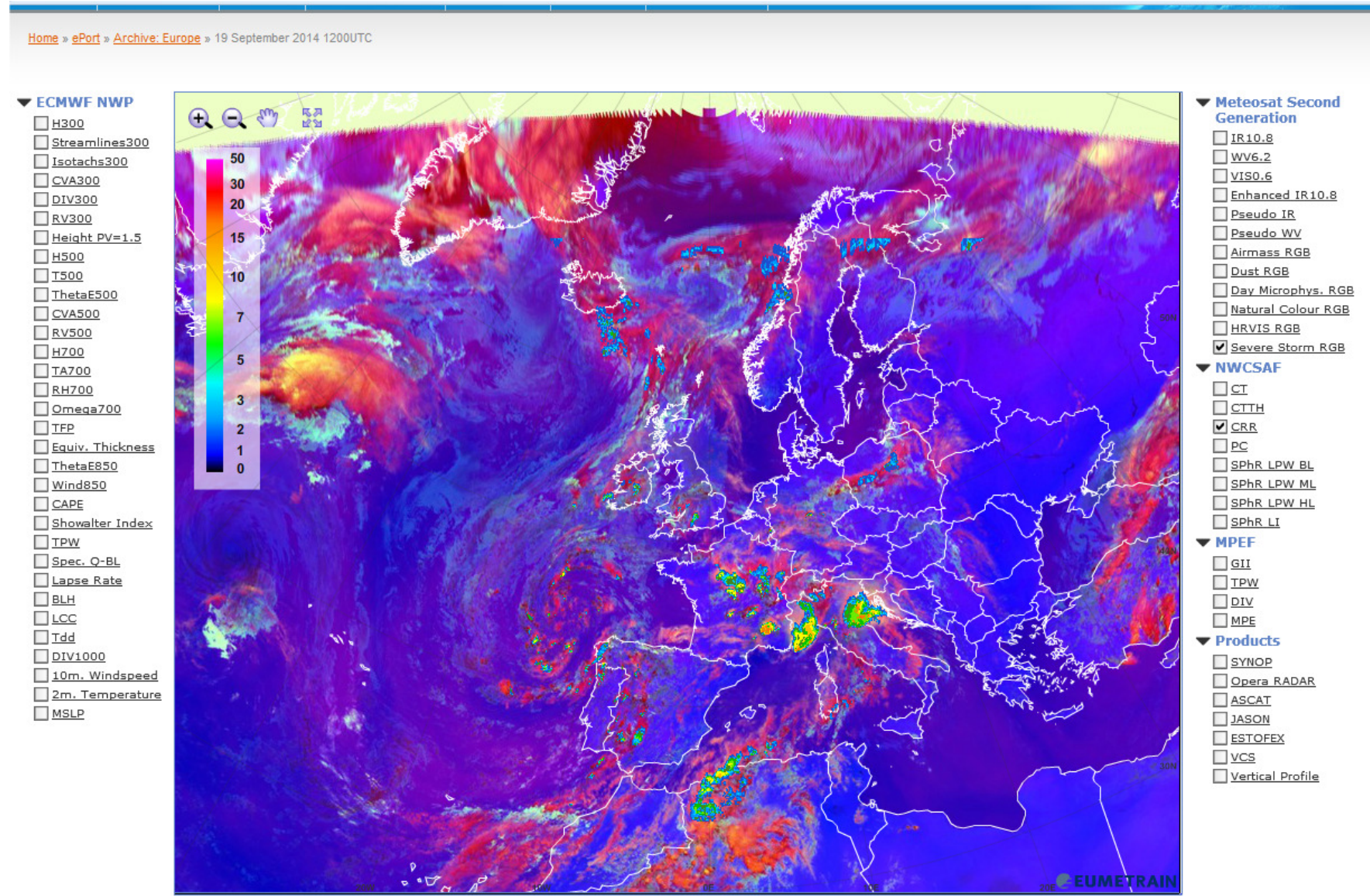
- GII
- TPW
- DIV
- MPE

Products

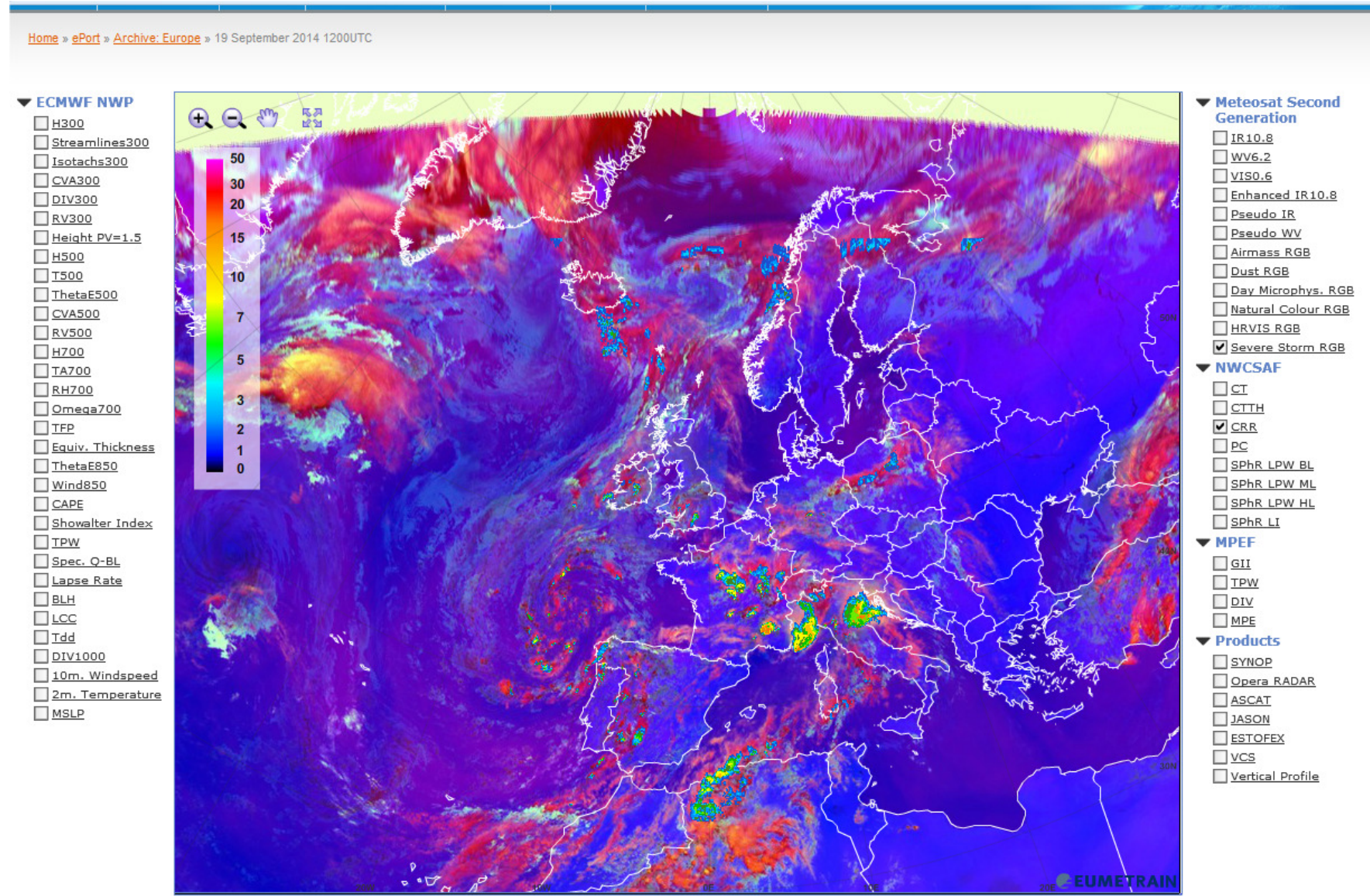
- SYNOP
- Opera RADAR
- ASCAT
- JASON
- ESTOFEX
- VCS
- Vertical Profile

EUMETRAIN

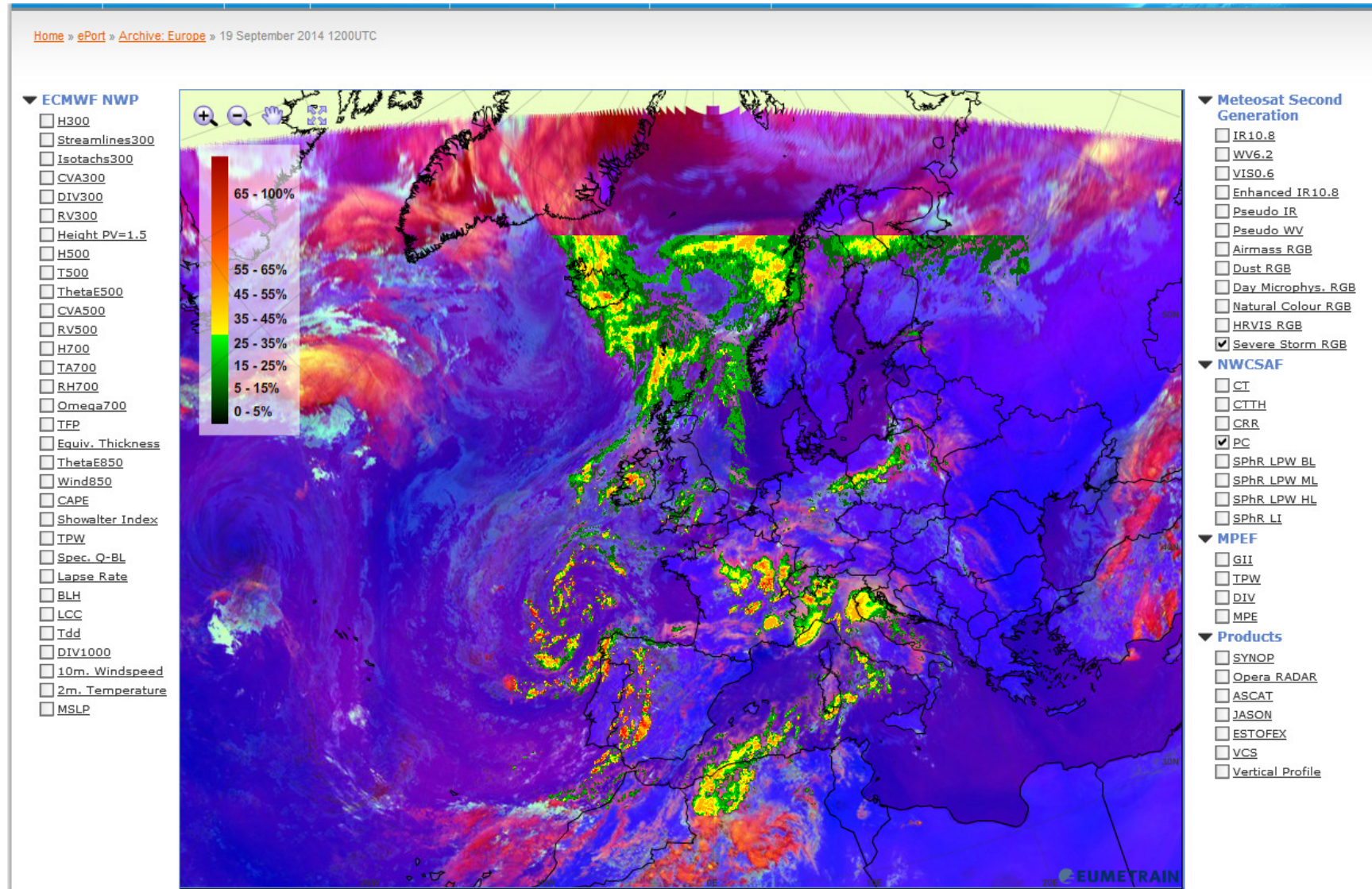
Activity: Overlaying Convective Rain Rate (CRR)



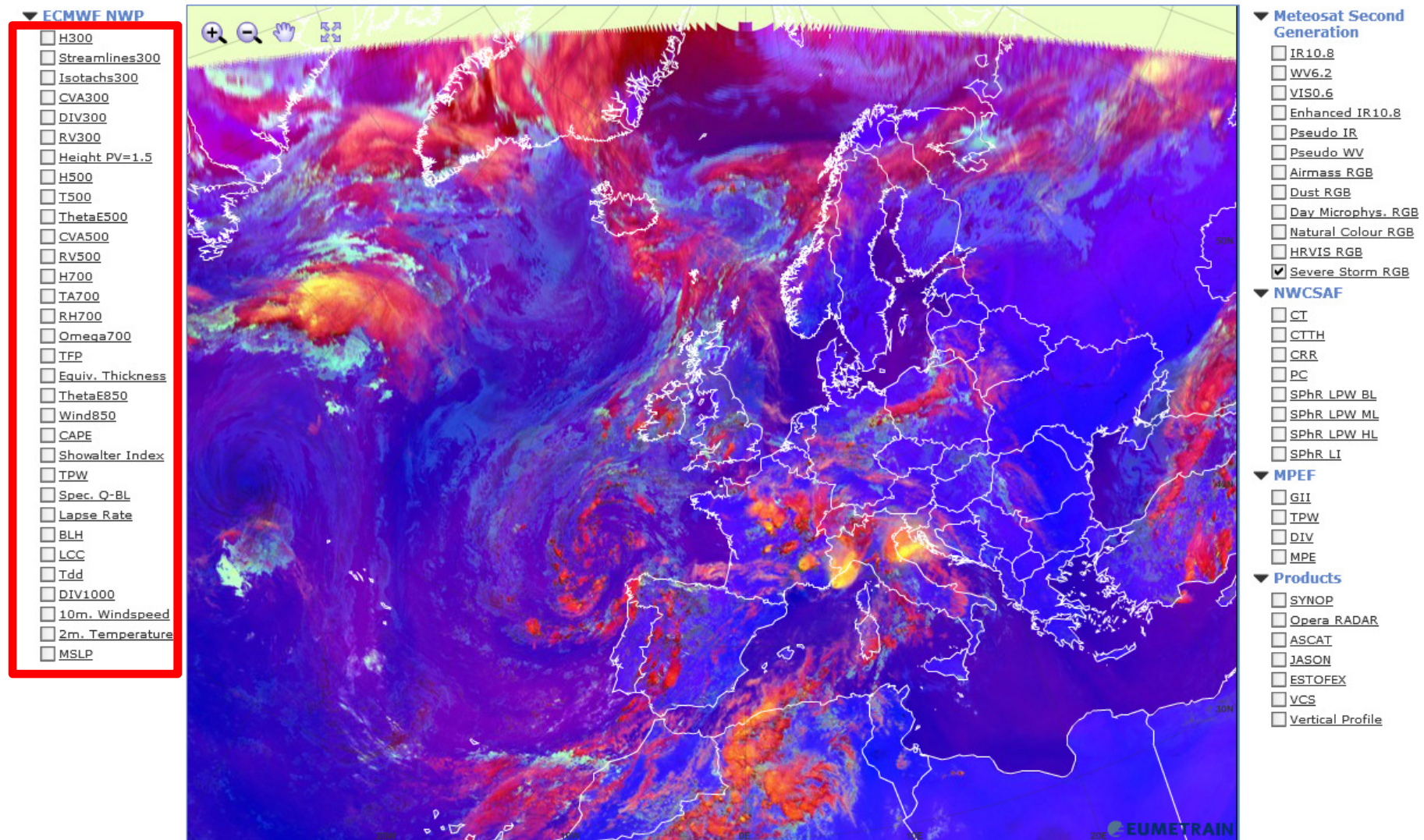
Activity: Overlaying Convective Rain Rate (CRR)



Activity: Overlaying Precipitating Clouds (PC)

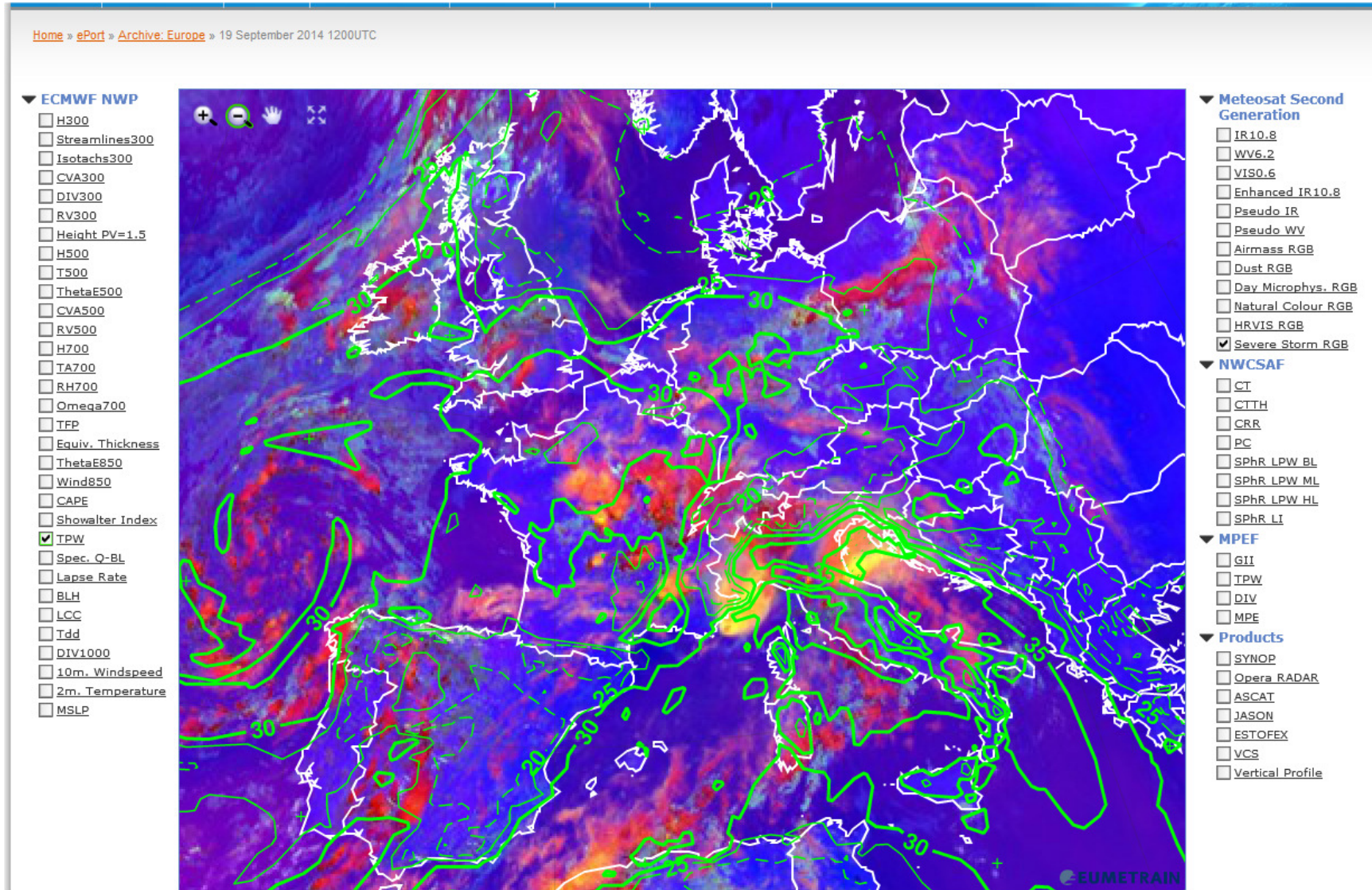


Activity: Exploring NWP

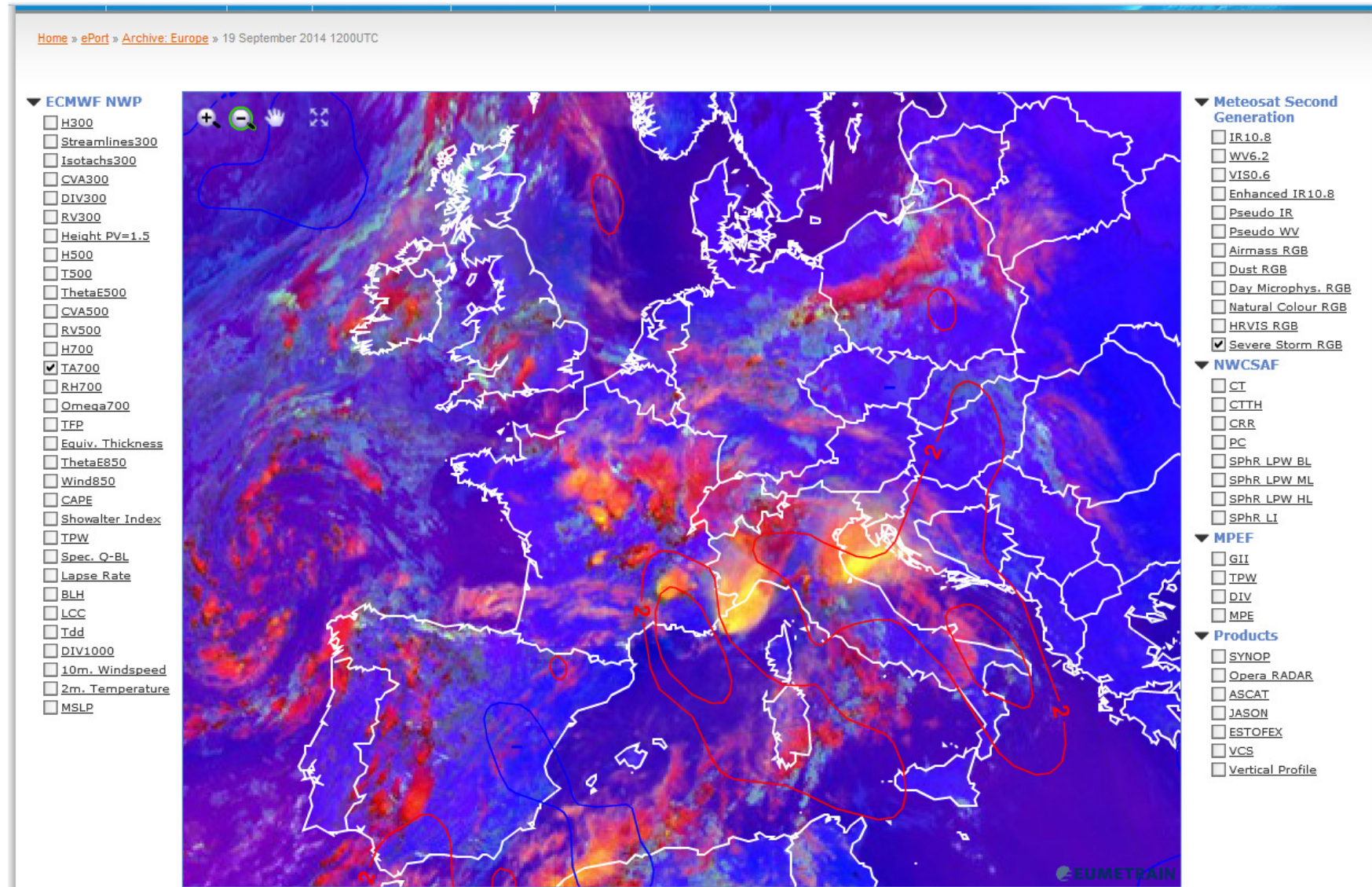


Activity: please explore the ECMWF NWP fields and indicate which of these NWP fields capture the key features identified in the Day Convection RGB product

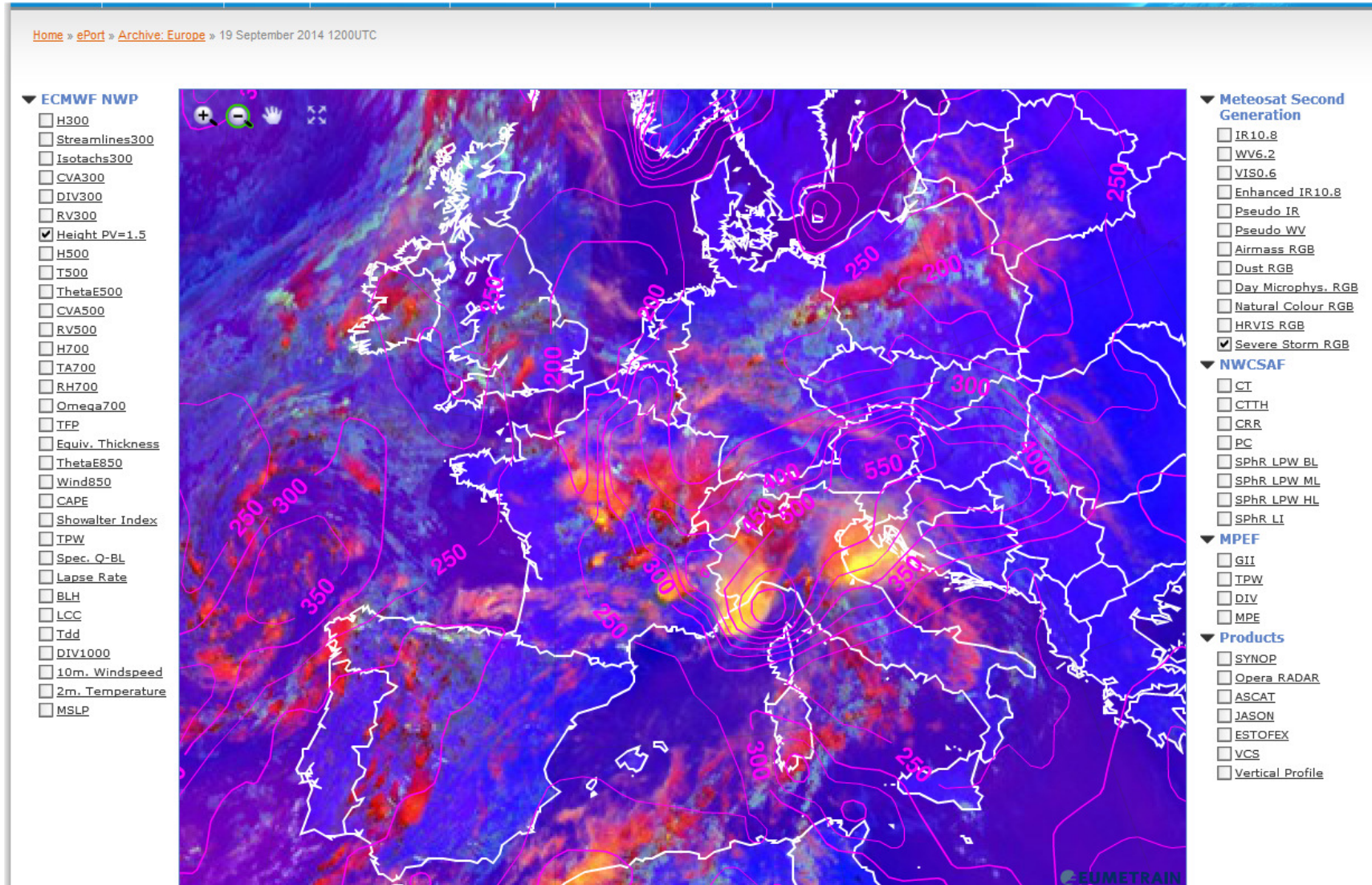
Recommended answer: Day Convection RGB and Total Precipitable Water



Recommended answer: Day Convection RGB and Temperature Advection (700hPa)



Recommended answer: Day Convection RGB and Height PV= 1.5 PVU



Summary

- Have briefly summarised RGB and Derived Products
- Derived Products to be used with Himawari-8 data in the Bureau
- Using the EUMETSAT ePort web page have interrogated RGB and Derived Products.
- The advantage of RGB products over single channel products
- Have compared RGB products with Derived Products – advantages and disadvantages.
- Gained a better understanding of RGB products by overlaying appropriate NWP parameters (NWP fields).