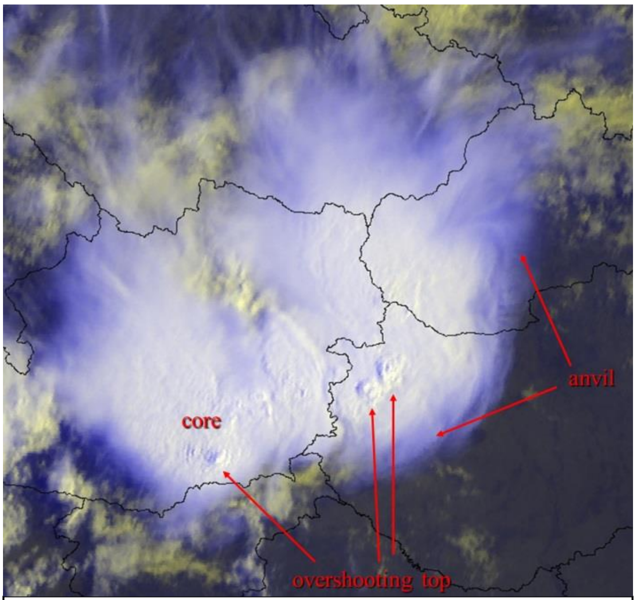
# SEVIRI HRV Cloud RGB
# Quick Guide

EUMETRAIN

**Aim**: Monitoring of convection in high resolution.
It is useful for any other high level cloud system monitoring (like fronts, cirrus) if high resolution is needed.
**Area and time period of its main application**: Low- and mid-latitude region, day time in convection season.
**Applications and guidelines**: This RGB type concentrates on *high cloud monitoring*. Thin and thick high clouds have good colour contrasts with each other, from lower level clouds, and from cloud free regions (including snow/ice). For convection monitoring *high temporal and spatial resolutions* are needed: *animations of 5-minute HRV Cloud RGB images* are useful in combination with other products showing information on cloud top microphysics and/or cloud top temperature distribution (possible presence of cold U, cold ring features). Mature thunderstorm cloud top features like overshooting tops, gravity waves and ice plumes are well seen in this RGB due to the shadows and the high resolution. Intense (and/or long lived) overshooting tops, gravity waves, long lived cold U/V and cold rings are indicators of strong updrafts and possibly severity.



SEVIRI HRV Cloud RGB for 29 June 2006 at 08:40 UTC

## Background

The table shows which channels are used in the HRV Cloud RGB and lists some of the land and cloud features which have typically low or high contribution to the colour beams in this RGB. This is the most 'traditional RGB', as it is based on channels which were available from Meteosat First Generation satellites. HRV is used in two colour beams to not lose the high resolution.

| Colour | Channel [µm] | Physically relates to | Small contribution to the signal | Large contribution to the signal |
|---|---|---|---|---|
| Red | HRV | Cloud optical thickness<br>Snow reflectivity | Thin clouds | Thick clouds |
| Green | HRV | Cloud optical thickness<br>Snow reflectivity | Thin clouds | Thick clouds |
| Blue | IR10.8 inverted | Cloud top temperature<br>Land/sea temperature | Warm cloud<br>Warm land / sea | Cold clouds |

Notation: HRV: High Resolution Visible channel, IR: infrared, number: central wavelength of the channel in µm. 'IR10.8 inverted' means that higher signals are assigned to cold brightness temperatures, while lower signals are assigned to warm brightness temperatures.

## Benefits

- Thin and thick high clouds have good colour contrast with each other. The semi-transparent part of the anvil and the thick storm core are well separated.
- High level clouds have good colour contrast against lower level clouds and cloud free regions (including snow/ice).
- Small developing (towering) cumulus clouds are recognisable earlier due to higher spatial resolution.
- Due to the higher spatial resolution one can see the cloud top structure better than in the 3 km resolution images.
  - Mature thunderstorm cloud top features like overshooting tops, gravity waves and ice plumes are better seen in this RGB due to the higher resolution.
  - The cloud top structure might provide useful information even in case of non-convective clouds. For example, low-level wave clouds and cloud streets are also better seen in higher spatial resolution. They give a hint of the wind.
- This RGB is nice and easy to understand, very good for the public.

## Limitations

- It works only during the day as it uses the shortwave channel.
- Close to midday the cloud top features like overshooting tops, ice plumes and gravity waves are not seen as well as at low solar elevation.
- This RGB type concentrates on high cloud monitoring. It does not provide complex cloud analyses. The colours of snow covered land, fog, low- and mid-level clouds appear in similar colours. It is not easy to distinguish them. Studying their form, structure and movement may help. Even better to use this RGB together with other types of images, e.g. with Day Microphysics RGB.
- This RGB type combines only two channels, thus two types of information. For example it does not contain microphysical (phase, size) information.

EUMETRAIN

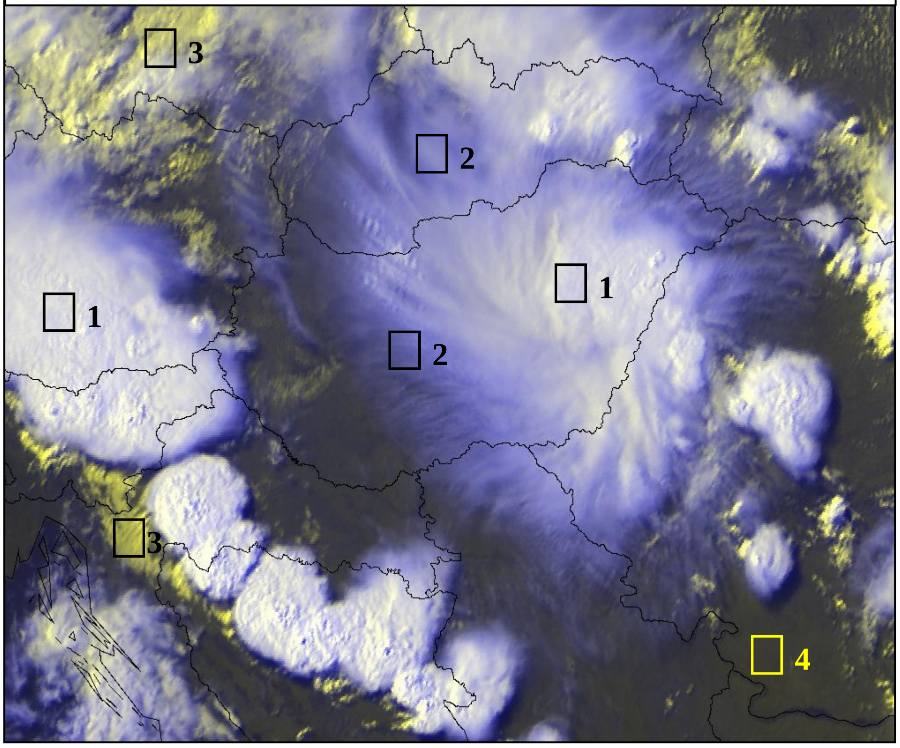
# SEVIRI HRV Cloud RGB Quick Guide

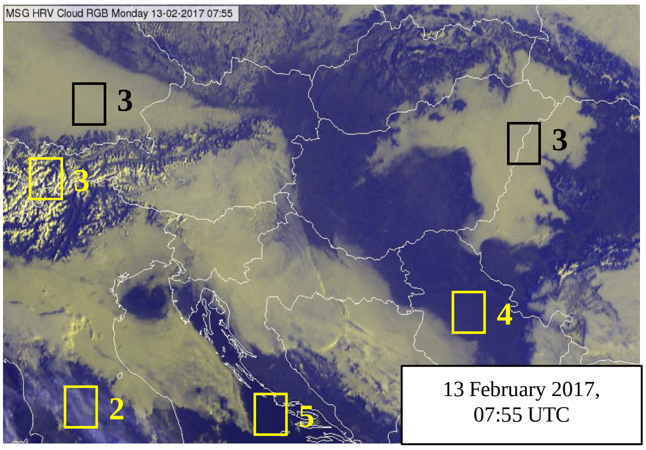
## Interpretation

| | |
|---|---|
| 1 | Thick high clouds (Bright greyish, whitish shades with shadows) |
| 2 | Thin high level clouds (Bluish shades depending on the transparency and the type of the underlying surface) |
| 3 | Fog, low- and mid-level clouds or snow covered land (Shades of yellow depending on the cloud top temperature, cloud thickness; temperature and state of the snow) |
| 4 | Snow-free land (Shades of grey with some bluish or yellowish tones depending on the temperature and surface reflectivity) |
| 5 | Ice-free sea (Shades of dark blue) |

Colours depend also on the solar and satellite viewing angles.

SEVIRI HRV Cloud RGB for 29 June 2006 at 15:10 UTC




13 February 2017, 07:55 UTC

Useful links:

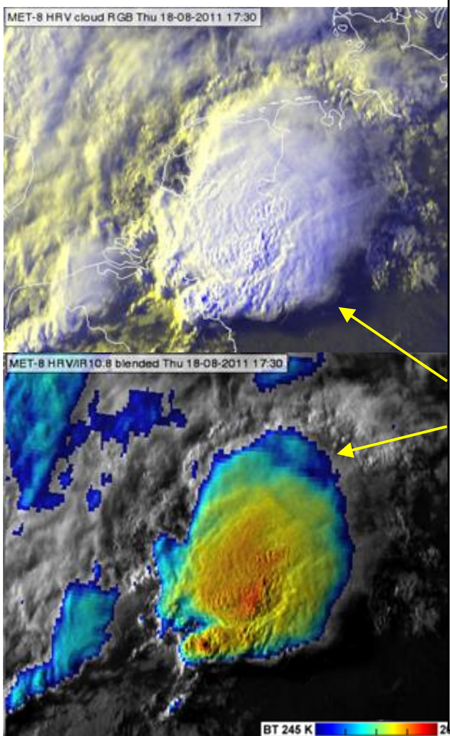
MSG Interpretation Guide

EUMeTrain Training Module

RGB Colour Interpretation Guide

NASA SPORT COMET module

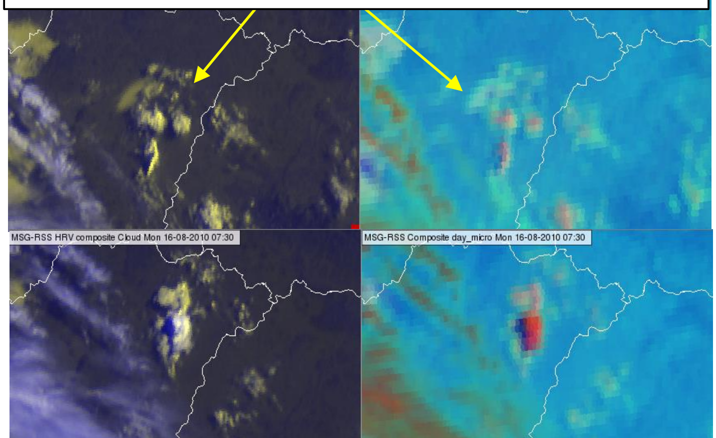
## Comparison to other products




Both the HRV cloud RGB and the HRV/IR10.8 blended (‘sandwich’) image combine HRV with the IR10.8 channel data, but in different ways. The blended image is designed to study the cloud top temperature distribution and its collocation with other cloud top features of mature thunderstorms: collocation of cold U/V, cold ring with overshooting tops, ice plumes, gravity waves, etc. The sandwich product is better for thunderstorm top analyses, while the HRV Cloud RGB sees and identifies thin Cirrus better.

HRV Cloud RGB (up) and HRV/IR10.8 blended image (bottom) 18 August 2011, 17:30 UTC

The HRV Cloud and the Day Microphysics RGB rapid scan image sequences together are a good combination to monitor the convective initiation and development. As the cumulus clouds become colder their yellow colour turns to white in the HRV Cloud RGB images. In the Day Microphysics RGB one can follow the glaciation of the cloud top as the cumulus clouds turn to red.




HRV Cloud RGB (left) and Day Microphysics RGB (right), 16 August 2010, 06:15 and 07:30 UTC