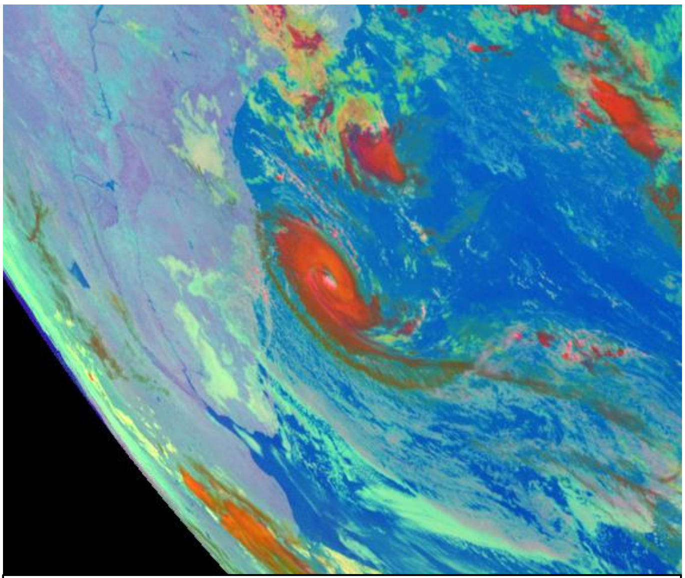
SEVIRI Day Microphysics RGB Quick Guide

Primary aim: To provide a complex cloud analysis, to distinguish **ice from water phase**, and to provide information on **cloud top particle size**, **temperature** and cloud **optical thickness**.
Secondary aims: Monitor the development of **convection**, fog and low clouds.
Time period and area of its main application: Daytime, throughout the year. Restrictions during winter for higher latitudes.
Guidelines: The Day Microphysics RGB is a **cloud-oriented** RGB. It provides a complex cloud analysis, merging cloud thickness with cloud top temperature and microphysical (phase and particle size) information. This RGB is tuned to highlight cloud top microphysical characteristics: **cloud top phase** and **cloud particle size**. On Day Microphysics RGB animations one can monitor the **phases/processes of developing convection** (i.e. the starting of glaciation at the cloud tops, the evolution of particle size and the dissipation process with mainly large ice crystals).



SEVIRI Day Micro RGB, 27 March 2004, 12:00 UTC

Background

The table below lists the channels used in the Day Microphysics RGB.
The red colour beam (**VIS0.8**) reflects cloud optical thickness. Optically thick clouds show a high contribution to the red colour beam.
The green channel (**IR3.9refl**) uses only the reflected part of the solar radiation at 3.9 µm. During the day the IR3.9 data includes reflected solar and emitted thermal radiation. The Day Microphysics RGB uses the reflectivity computed from the solar component. The solar component is depending on **cloud phase** on one hand and on **particle size** on the other. Water droplets reflect more solar radiation at this wavelength than ice crystals. This property is overlaid by the particle size effect: Large water drops or ice crystals reflect less solar radiation than small water droplets or ice crystals. The blue channel (**IR10.8**) reflects surface and cloud top temperatures, where warm temperatures result in a high blue contribution and cold temperatures in a low blue contribution (inversed IR image).

Colour	Channel [µm]	Physically relates to	Smaller contribution to the signal of	Larger contribution to the signal of
Red	**VIS0.8**	Cloud optical thickness	Thin clouds	Thick clouds
Green	**IR3.9refl**	Cloud microphysical properties	**Ice clouds** **Large particles**	**Water clouds** **Small particles**
Blue	**IR10.8**	Temperature	Cold thick clouds	Warm land/sea Warm Clouds

Notation: IR: infrared, VIS: visible; channel number: central wavelength of the channel in micrometer.
IR3.9refl: 3.9 µm reflectivity computed from the solar component of the measured IR3.9 radiation.

Benefits

- Good colour contrast between ice and water clouds, especially for water clouds with small droplets.
- Provides information on cloud particle size. Orange colour indicates the presence of small ice crystals on top of cumulus clouds.
- Good colour contrast between water clouds with small droplets and snow on ground.
- Provides information on cloud optical thickness.
- Provides information on cloud top temperature.
- It detects wildfires.
- Detection of super-cooled water clouds.

Limitations

- Available during the day only.
- Pixel colour fades during dawn/dusk when the sun's angle is low.
- The proper interpretation of all colour shades needs practice.
- Not applicable for higher latitudes during winter season.

More about RGBs on www.eumetrain.org
Contact: info@eumetrain.org

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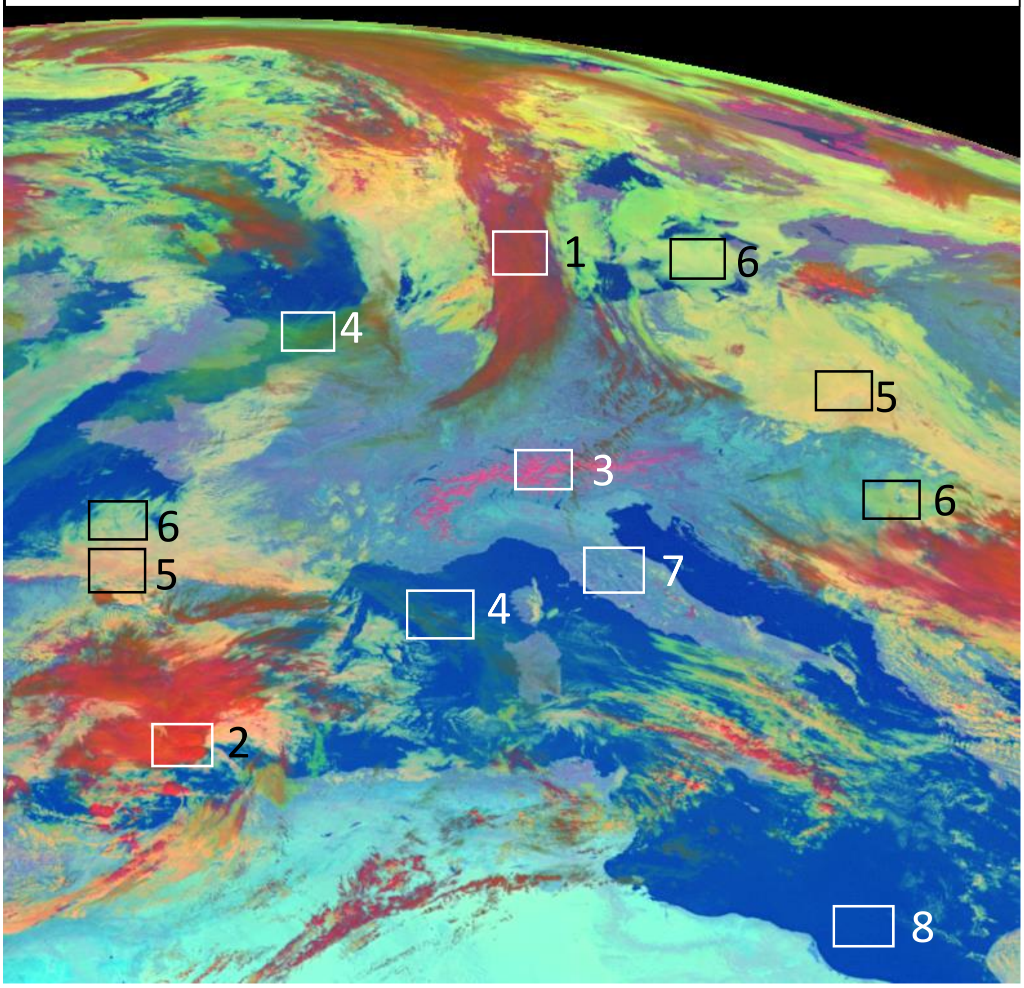
Colour Interpretation

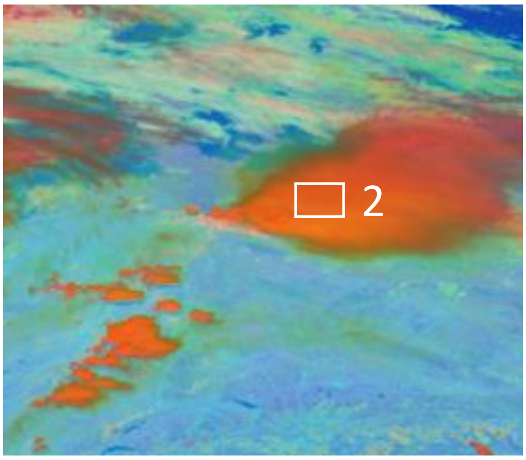
1	Thick ice clouds with large ice particles.
2	Thick ice clouds with small ice crystals on top.
3	Snow and ice on the ground.
4	Semi-transparent ice clouds. *
5	Low to mid-level **thick** water clouds with large particles.
6	Low to mid-level **thick** water clouds with smaller particles.
7	Cloud-free land.
8	Oceans and lakes.

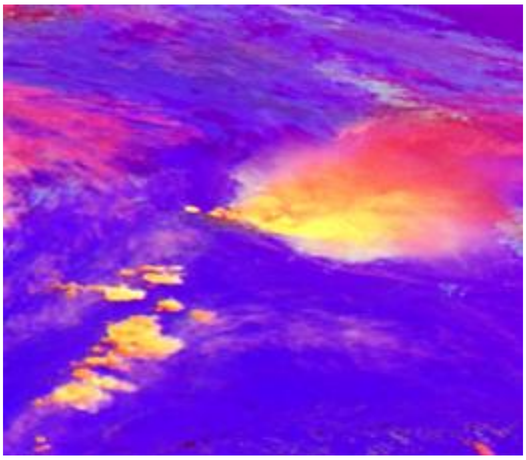
* The colour shade may depend on the type of the underlaying surface.

SEVIRI Day Microphysics RGB, 13 March 2017, 12:00 UTC



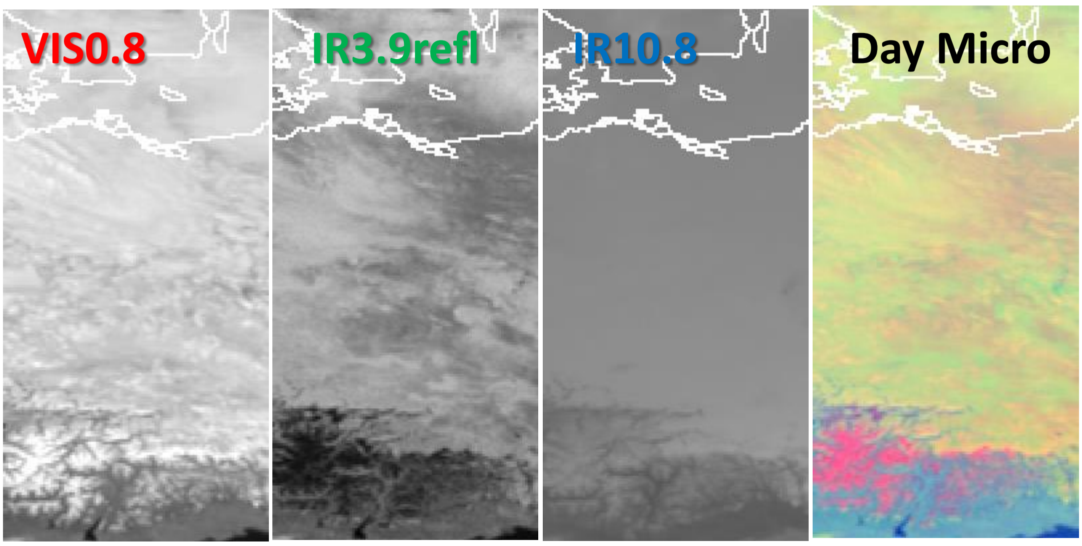
Day Microphysics RGB, 22 June 2017, 12:00 UTC





Left hand images: In case of **highly active** thunderstorms, the **Day Microphysics RGB** (left image) turns from dark red into a bright orange. This colour change is owed to the sensitivity of the **IR3.9** channel to **ice particle size**. The same effect of channel IR3.9 can be observed in the **Severe Storms RGB** (right image) which offers more distinct information about the storm's activity centers.

Drop size effect



18 February 2017, 12:00 UTC
The VIS0.8 image shows optically thick cloudiness over central Europe with a more patchy cloud structure over Poland and the Czech Republic. The IR3.9refl image shows **larger** water droplets over Poland and East Germany reflecting less sunlight at 3.9 µm than the **smaller** drops over central Germany. The IR10.8 image indicates uniformly warm cloud top temperatures. In the **Day Microphysics** image, this cloud physical property is reflected with **magenta** tones for larger cloud droplets and with **pinkish-green** hues for small cloud droplets.