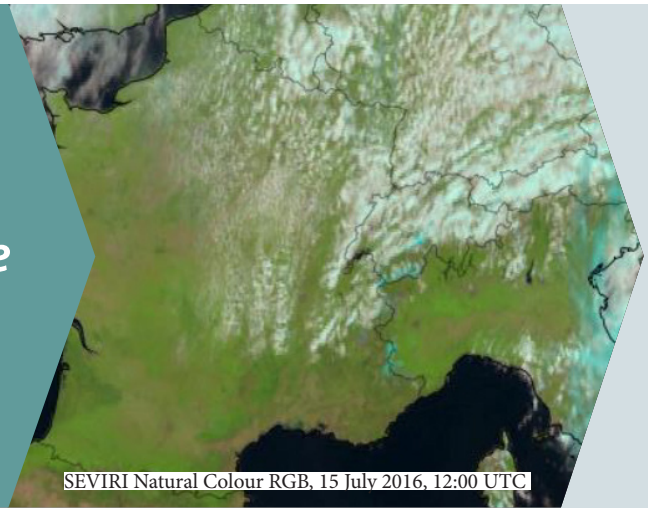
EUMeTrain

SEVIRI Natural Colour RGB

Quick Guide


SEVIRI Natural Colour RGB, 15 July 2016, 12:00 UTC

Primary aim

Display **surface characteristics** (e.g. snow/vegetation/bare soil). Similar to a True Colour image except for ice, ice clouds and snow.

Secondary aim

Distinguishing **ice from water phase** (water clouds from ice clouds or from cloud-free snow).

Time period and area of its main application:

Daytime, throughout the year. Restrictions during winter for higher latitudes.

Guidelines

The Natural Colour RGB is tuned to provide a satellite image which provides **surface vegetation information** and which resembles a colour photograph of the Earth. The three daylight channels provide similar colours to a True Colour image of the Earth, except for ice crystals (ice clouds, snow and ice) which are depicted in cyan. This RGB is sensitive to photosynthetically active vegetation while deserts, bare soils and dry vegetation show in a different colour. Snow on the ground can be distinguished from ice clouds, not so much by its hue than by its structure.

Background

The table below lists the channels used in the Natural Colour RGB. The SEVIRI channel (**VIS0.6**) scans the Earth in the orange visible spectrum. As this channel is the one nearest to the blue spectrum it is used for the blue colour beam of the Natural Colour RGB. The green colour beam (**VIS0.8**) is already in the IR spectrum and, therefore, not visible to the human eye. However, plants strongly reflect solar radiation at this wavelength when they are photosynthetically active (see example above). The **NIR1.6** channel used for the red colour beam is primarily sensitive to the ice and water phase of clouds. At 1.6 µm, **ice clouds** usually have a low reflectivity (~30%), while **water clouds** strongly reflect (~60-70%) the incoming radiation. Therefore, ice clouds are usually darker than water clouds in the **NIR1.6** image. Additionally, there is a less pronounced dependency upon cloud particle size at 1.6 µm. Ice clouds with very small ice crystals may be as bright as water clouds, and water clouds with very large droplets may be as dark as ice clouds.

Colour	Channel (mm)	Physically relates to	Smaller contribution to the signal of	Larger contribution to the signal of
Red	**NIR1.6**	Cloud phase Snow cover	Ice clouds ***Snow covered land/sea ice***	Water clouds
Green	**VIS0.8**	Cloud optical thickness Green vegetation	Thin clouds	Thick clouds ***Snow covered land / Vegetation***
Blue	**VIS0.6**	Cloud optical thickness Green vegetation	Thin clouds **Vegetation**	Thick clouds **Snow covered land / Sea ice**

Notation: NIR: near-infrared, VIS: visible; channel number: central wavelength of the channel in micrometer.

Benefits

- Easy to interpret because most of the colours of the image are very similar to a True Colour image of the Earth.
- Reflects surface characteristics like vegetation, rocky soils and deserts.
- Ice clouds can be distinguished from water clouds.
- Snow on the ground, as well as frozen sea ice, can be detected.
- There is a high colour contrast between snow and fog/water clouds.

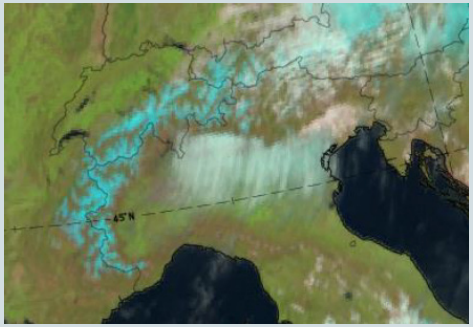
Limitations

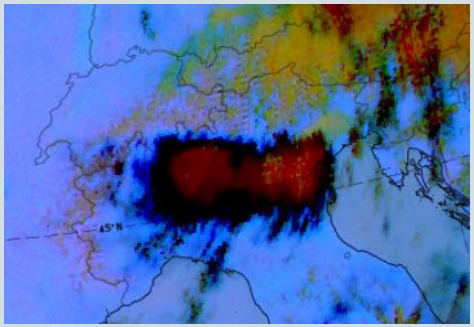
- Available during the day only.
- Pixel colour fades during dawn/dusk when the sun angle is low.
- Not applicable for higher latitudes during winter season.
- Snow-covered land might have similar colour as high clouds with large ice crystals.
- Very small ice crystals in cirrus clouds appear whitish instead of cyan.
- The cyan colour as indication for ice phase clouds can be misleading in the case of large water droplets. The latter absorb shortwave solar radiation at 1.6 µm the same way small ice crystals do.
- Thin cirrus clouds are not seen in the Natural Colour RGB.

SEVIRI **Natural Colour** RGB QG

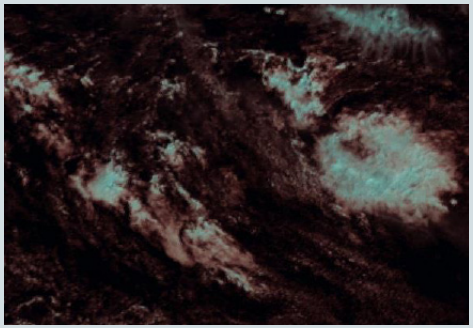
1	Water clouds (fog or stratus)	5	Ground covered by photosynthetically active vegetation
2	Mixed phase clouds or clouds with a cirrus veil on top	6	Sandy deserts, bare soils or arid vegetation
3	Thick ice clouds with large ice crystals in higher levels	7	Sea ice not covered by snow
4	Snow and ice on the ground	8	Oceans and lakes.

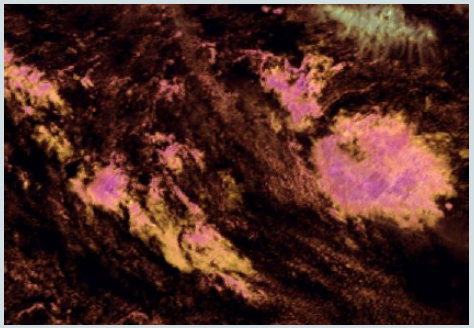
Limitations





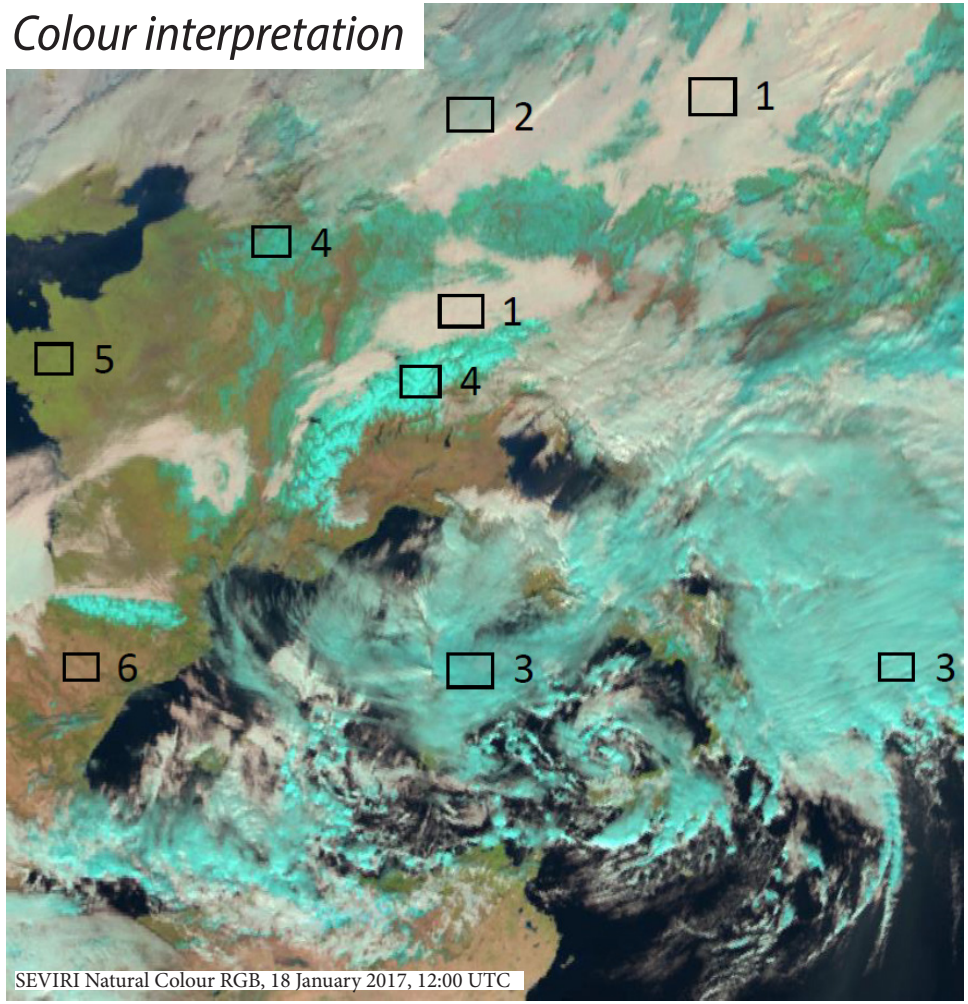
In the case of **very small ice particles** (e.g. orographic clouds) as shown in the left image over northern Italy on 7 April 2017 at 12:00 UTC, the colour of the ice cloud becomes whitish. The **Dust RGB** (right image) of the same date shows a compact ice cloud.



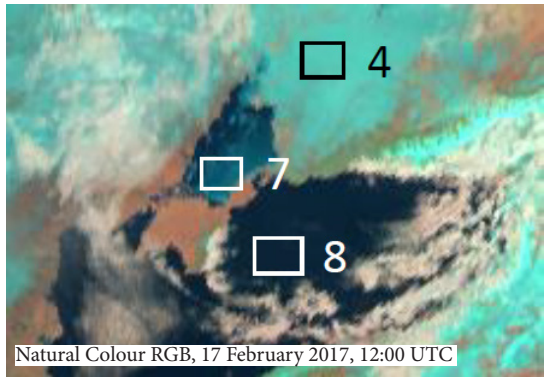


If water droplets reach bigger sizes, the Natural Colour RGB will depict them in cyan hues as shown in this example over the Tropical Sea (left image). A comparison to the **Cloud Phase RGB** (right image) shows that most clouds are water clouds (magenta to yellow), and only the cloud in the upper right image corner is an ice cloud.

Colour interpretation



SEVIRI Natural Colour RGB, 18 January 2017, 12:00 UTC



Natural Colour RGB, 17 February 2017, 12:00 UTC

Sea ice and snow covered land (item 4 and 7) can vary in the colour shade depending on the compactness of sea ice and of the snow cover on the ground. Extended snow fields on mountain tops will show brighter cyan colour than snow cover in urban areas or forests.