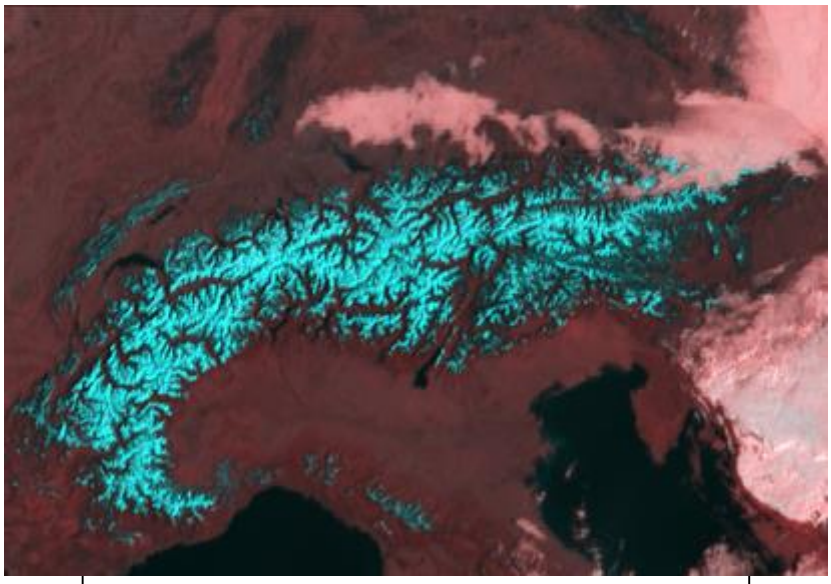
SEVIRI HRV Fog RGB
Quick Guide

Aim: Distinguishing of fog/low clouds from snow-covered land in high resolution.
Area and time period of its main application: Mid-latitude region, daytime during winter.
Application and guidelines: The identification of foggy and low cloud-covered areas is important for traffic and aviation security. Winter fog/stratus frequently forms over snowy cloud-free surfaces in high pressure conditions. Fog/water clouds have good colour contrast against snow and snow-free land.
This is a daytime RGB as it uses shortwave channels.



SEVIRI HRV Fog RGB for 7 March 2014, 08:40 UTC

Background

The table shows which channels are used in the HRV Fog RGB and lists some of the land and cloud features which typically make a low or high contribution to the colour beams in this RGB. Snow's reflectivity is much higher in the HRV than in the NIR1.6. As water clouds reflect much of the radiation in both channels they can be used in combination to distinguish snow and water clouds.

Colour	Channel [µm]	Physically relates to	Smaller contribution to the signal of	Larger contribution to the signal of
Red	**NIR1.6**	Cloud phase Snow reflectivity	Ice cloud **Snow covered land**	**Water clouds**
Green	**HRV**	Cloud optical thickness Snow reflectivity	Thin clouds	**Thick clouds** **Snow covered land**
Blue	**HRV**	Cloud optical thickness Snow refllectivity	Thin clouds	**Thick clouds** **Snow covered land**

Notation: HRV: High Resolution Visible channel, NIR: near-infrared, number: central wavelength of the channel in micrometer.
HRV is used in two colour beams so the high resolution is not lost.

Benefits

- Detection of the cloud phase: ice and water clouds appear in different colours (in most cases → see limitations).
- Detection of snow: snow-covered land and snow-free land have different colours.
- Fog and water cloud have good colour contrast both against snow-covered and snow-free land.
- High resolution:
  - Smaller patches of snow, fog or low clouds are recognisable.
  - The structure of the land and cloud features are better seen.
- This RGB is easy to understand, it has nice colours. It is relatively good for the public.

Limitations

- It works only during the day. At night the Night Microphysics RGB can be used.
- In twilight conditions the colour contrast may get lower.
- Snow/fog/low cloud is not seen under higher level thick clouds.
- Fog and low clouds cannot be distinguished based on their colours. Studying the form, structure and movement may help.
- The colours of snow and ice clouds are similar (ice cloud may have some more grey shades). It is not easy to distinguish them. Studying their form, structure and movement may help.
- This RGB type only combines two channels, thus two types of information. It does not contain, for example, temperature information.
- The separation between ice and water clouds is not perfect. Water clouds with large droplets can have similar colours as ice clouds; ice clouds with small ice crystals can have similar colours as water clouds.

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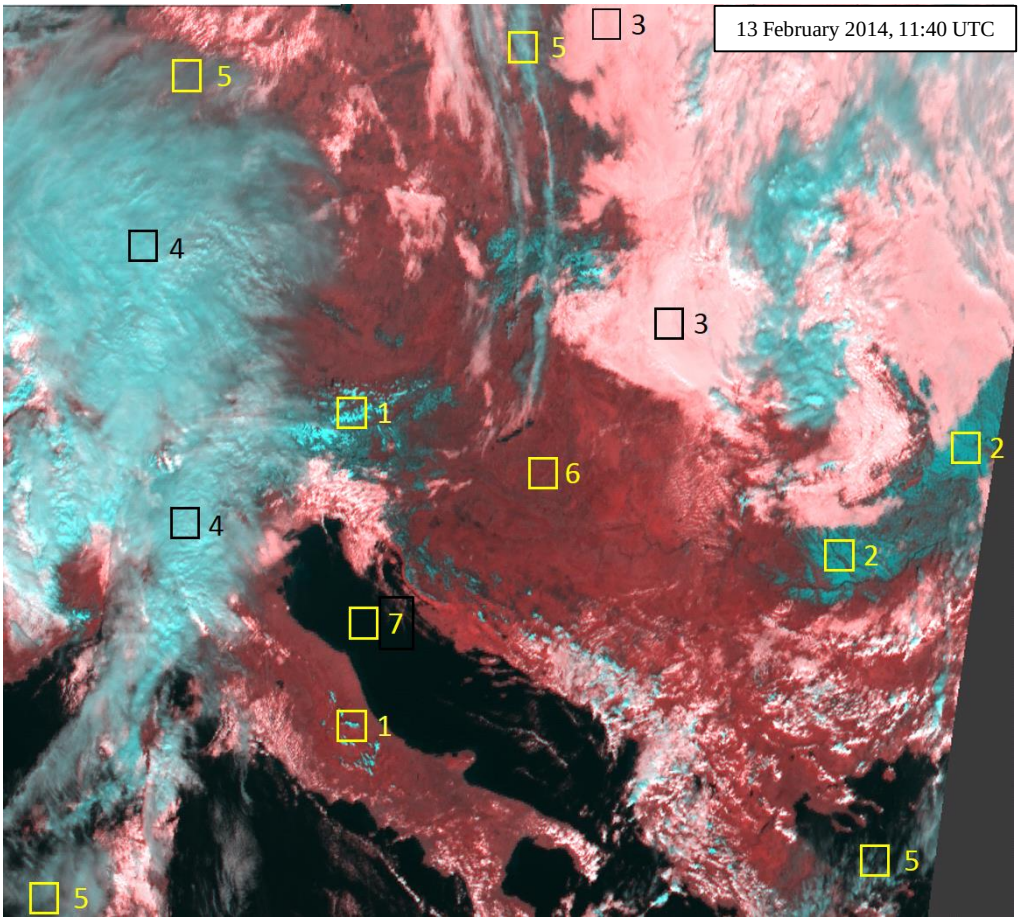
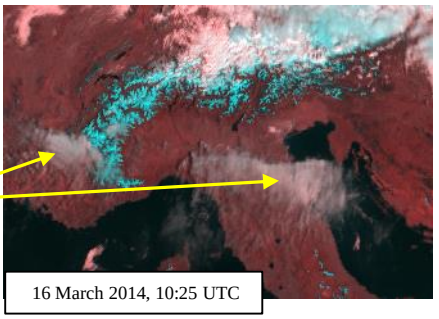
Interpretation

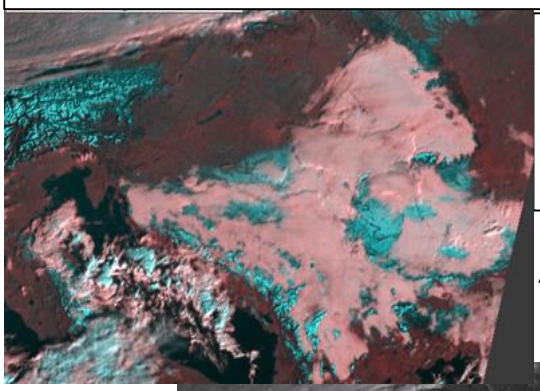
1	Snow-covered high mountains (Shades of bright cyan)
2	Snow-covered lowland (Shades of greyish cyan with patches, lines)
3	Fog or water cloud (Shades of pink, in case of very large droplets, it may have some cyan tones)
4	Thick ice cloud (Shades of greyish cyan, in case of small ice crystals, it may have some pinkish-greyish tones)
5	Thin ice cloud (Shades of cyan depending on the transparency and the type of the underlying surface; in case of small ice crystals it may have pinkish tones)
6	Snow-free land (Shades of reddish brown)
7	Ice-free sea (Shades of black)



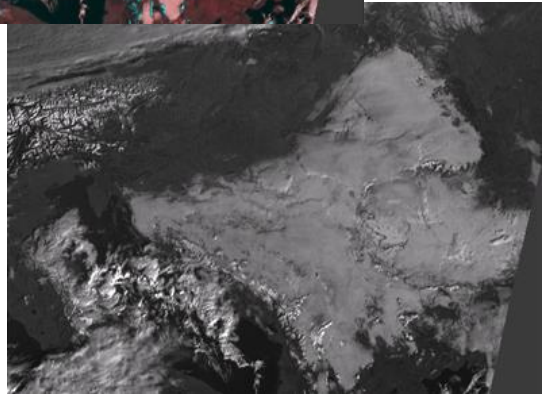
Colours depend on the solar and satellite viewing angles, on the quality of the snow, and whether the area is totally covered by snow. Snow on high mountains usually has a brighter colour than on hills or lowlands, as the snow cover is less disrupted by vegetation.
The colour of a cloud also depends on the size of the cloud top particles. Water clouds with large droplets may appear slightly cyan. Ice clouds with extreme small crystals may appear pinkish-whitish, like the high-level lee clouds in the image on the right (indicated by arrows).


16 March 2014, 10:25 UTC

Comparison to other products



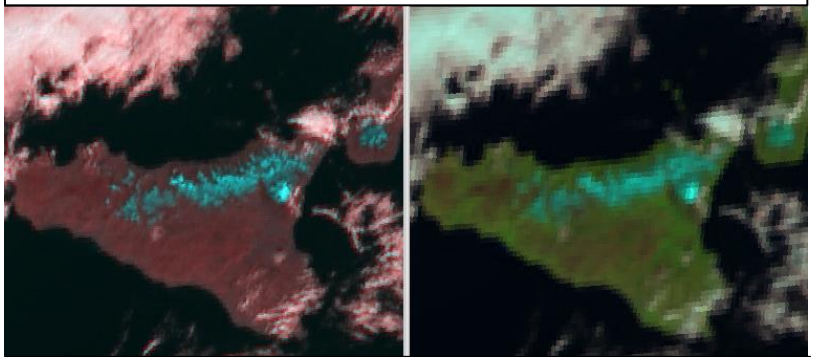
In the HRV Fog RGB image (left) one can distinguish snow from fog or water clouds much easier than in HRV image (bottom).


HRV Fog RGB (up) and HRV (bottom) for 28 November 2013, 07:40 UTC

The HRV Fog RGB is created following the EUMETSAT recommended recipe. Using different ranges and/or gamma corrections will modify the colours.

More about RGBs on EUMeTrain.org
Contact: info@eumetrain.org;

Natural Colour RGB (right) also detects snow and fog/water clouds in different colours and it provides vegetation information as well, but it has lower spatial resolution.


HRV Fog RGB (left) and Natural Colour RGB (right), 12 January 2017, 09:40 UTC