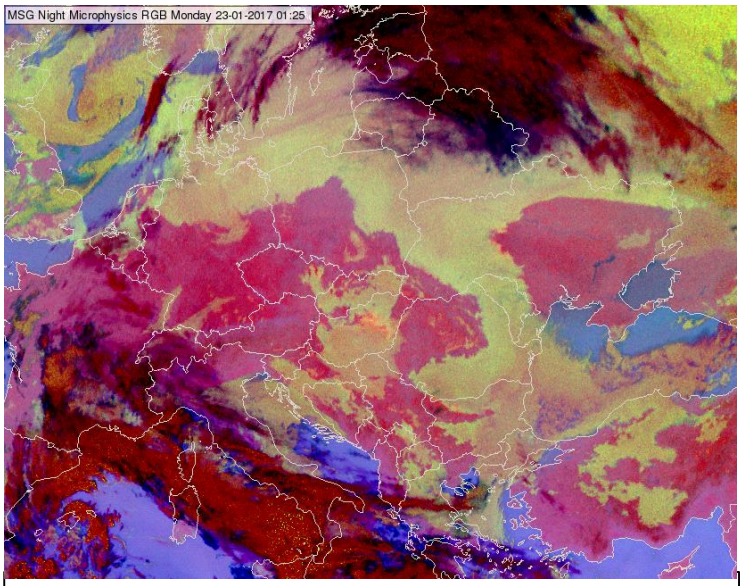
SEVIRI Night Microphysics RGB
Quick Guide

Primary aim: **Detection of fog/low clouds** at night
Secondary aims: F**ull cloud analyses** at night and fire monitoring
Time period and area of its main application: Low- and mid- and high-latitudes, at night. In cold winter situations, the 24-hour Microphysics RGB is more useful.
Guidelines: It provides the **best colour contrast** between fog/low cloud and cloud-free area at night. However, in the case of solar radiation (during the day, twilight, solar equinox around midnight) this RGB is not usable.
Over cloud-free areas moisture boundaries might be seen.



SEVIRI Night Microphysics RGB, 23 January 2017, 01:25 UTC

Background

The table shows which channels (or channel differences) are used in this RGB type, and lists some of the land and cloud features which typically make a low or high contribution to the colour beams in this RGB. **IR10.8–IR3.9** is the key channel difference for fog/low cloud detection. The **IR12.0–IR10.8** channel difference helps to separate thin from thick clouds. **IR10.8** channel helps to separate thick clouds according their cloud top temperature. The colour of the cloud-free surface depends not only on the surface temperature, but also on the atmospheric low-level moisture content.

Colour	Channel (difference)	Physically relates to	Smaller contribution to the signal of	Larger contribution to the signal of
Red	IR12.0–IR10.8	Cloud optical thickness	Thin clouds	Thick clouds
Green	IR10.8–IR3.9	Cloud phase	Thin ice clouds	Thick fog/water clouds
Blue	IR10.8	Cloud top temperature Land sea temperature	Cold clouds	Warm surface Warm clouds

Notation: IR: infrared, number: central wavelength of the channel in micrometer.

Benefits

- At low and mid-latitudes the Night Microphysics RGB provides the best colour contrast between water clouds and cloud-free surface at night.
- It provides full cloud analysis at night.
- In some special conditions it provides nighttime snow detection – only if the temperature is very low and the snow is deep enough to completely cover the vegetation.
- It detects dust clouds.
- It detects fires, even if they are much smaller than the pixel size.

Limitations

- It is not designed to be used during the day. During the day the HRV Fog, the Day Microphysics or the 24-hour Microphysics RGBs are recommended for fog or low cloud detection.
- The colours change in cases where solar radiation is present: all clouds appear magenta, except the fog/low clouds which may even ‘disappear’ during twilight. Around the solar equinox the IR3.9 channel may contain some solar radiation around midnight, spoiling this RGB at some areas.
- Fog and low clouds cannot be separated from each other based only on their colours.
- Fog/low cloud can be covered by higher level clouds. If there are thin cirrus clouds above fog/low clouds, the Night Microphysics RGB might not detect the fog/low clouds.
- The thinner the low clouds/fog the more the colour looks like the colour of the ground (pinkish). The detection of very thin fog/low cloud is problematic.
- The IR3.9 brightness temperature values of the high, very cold clouds are often noisy resulting in green dots in the reddish-brownish ice clouds. Therefore, this RGB is not recommended for night-time convection analysis. The IR10.8 single channel is more appropriate for this purpose.
- There is no snow detection at night – except some special cases (see benefits).

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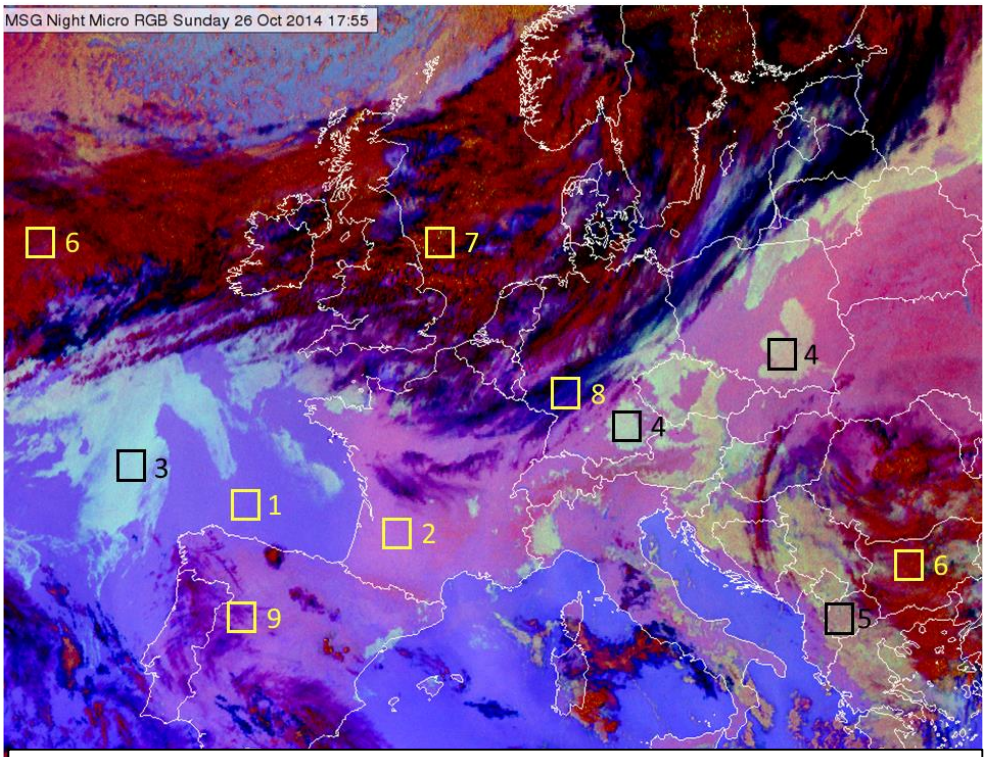
Interpretation

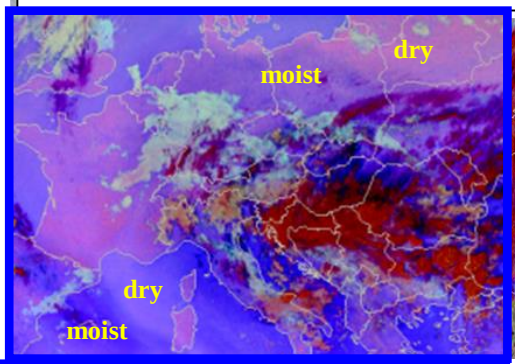
Colours may depend on viewing angles.

- **1, 2** Cloud free sea and land (Shades of blue or pink depending on temperature and water vapour content)
- **3** Warm, thick fog/low cloud, with small droplets (Shades of aqua)
- **4** Cold, thick fog/low cloud (Greenish in case of small droplets; pinkish grey in case of large droplets or thin cloud)
- **5** Thick mid-level cloud (Shades of tan)
- **6** Thick ice cloud (Reddish brown)
- **7** Very cold thick ice cloud (Reddish brown with green dots)
- **8** Thin cirrus (Shades of dark blue)
- **9** Very thin cirrus (Shades of magenta depending on the transparency and the type of underlying surface)
- **10** Clouds during daytime (Shades of magenta, red or blue)

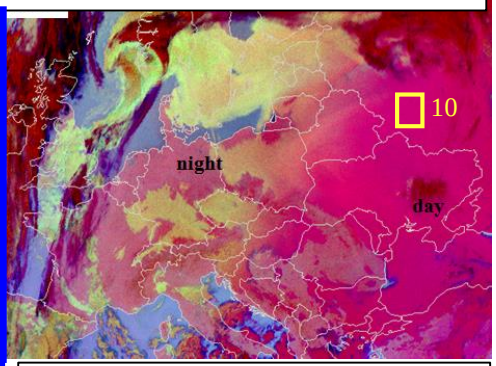
SEVIRI Night Microphysics RGB for 26 October 2014, 17:55 UTC



3 September 2014, 20:40 UTC



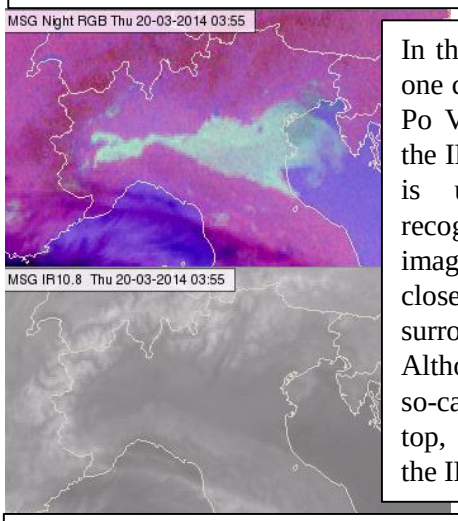
15 January 2006, 08:55 UTC



Over cloud-free areas moisture boundaries might be seen. The colour of the cloud-free area depends on the surface temperature and (low-level) moisture: moist areas have less red (look more bluish) and dry areas have more red (look more pinkish).

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

Comparison to other products

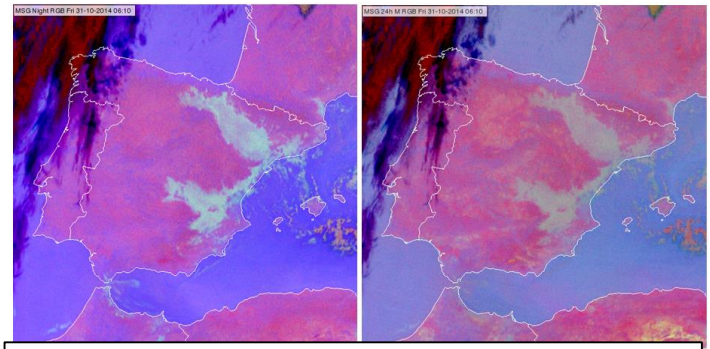


Night Microphysics RGB (up) and IR10.8 image (bottom), 20 March 2014, 03:55 UTC

In the Night Microphysics RGB one can clearly see the fog in the Po Valley, much better than on the IR10.8 image. Fog/low cloud is usually not, or hardly, recognisable in the IR10.8 image, as its top temperature is close to the temperature of the surrounding cloud-free area. Although the example shows a so-called "black fog" with warm top, it is not as eye-catching in the IR10.8 image.

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

At low and mid-latitudes the Night Microphysics RGB provides better colour contrast between fog/water clouds and the surface than the 24-hour Microphysics RGB does.



Night Microphysics (left) and 24-hour Microphysics (right) RGBs, 31 October 2014, 06:10 UTC