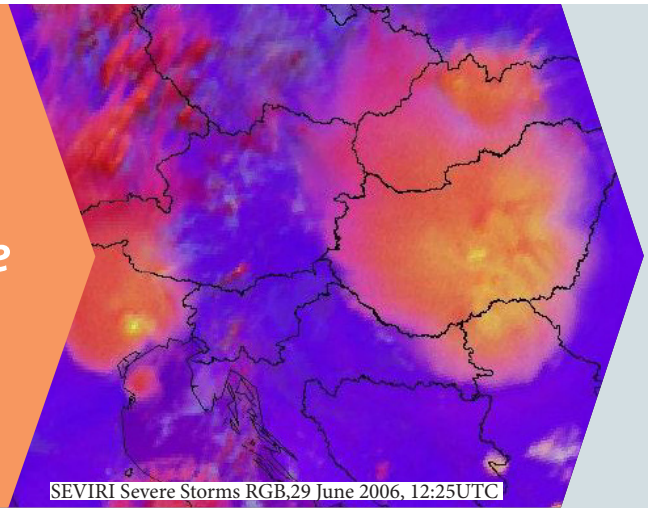
EUMeTrain

SEVIRI Severe Storms RGB

Quick Guide


SEVIRI Severe Storms RGB,29 June 2006, 12:25UTC

Primary aim
Monitoring of convection

Secondary aims
Monitoring (the cloud top microphysics) of high clouds

Time period and area of its main application:
Daytime, in convection season at low- and mid-latitudes, although different tunings/versions should be used for low- and mid-latitudes.

Guidelines
Ice clouds usually have large ice crystals at the top. For the mid-latitude continental storms the presence of small ice crystals on (or above) the cloud top and/or very cold cloud top temperatures are possible indicators of severity. This RGB was tuned to highlight such high clouds, and it does this with excellent colour contrast. However, one has to be careful when using this RGB, to interpret it well. Non-convective clouds can also consist of small ice crystals. Small ice crystals can be present in a convective cloud top without a strong updraft.

Background

The table shows which 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. **WV6.2–WV7.3** is used to highlight high-level clouds. **NIR1.6–VIS0.6** is used to separate ice from water clouds. **IR3.9–IR10.8** is used to highlight those cloud tops which are covered by small ice crystals and/or which are very cold.

Colour	Channel (mm)	Physically relates to	Smaller contribution to the signal of	Larger contribution to the signal of
Red	**WV6.2–WV7.3**	Cloud top height	No mid or high clouds	High-level clouds
Green	**IR3.9–IR10.8**	Cloud top particle size and temperature	Opaque ice cloud with large cloud top particles and/or not very cold cloud top temperature	Opaque ice cloud with small crystals and/or very cold cloud top temperature
Blue	**NIR1.6–VIS0.6**	Cloud top phase	Thick ice clouds	Water clouds / Land, sea surface

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

Benefits

- It highlights with excellent colour contrast those high clouds whose cloud tops are very cold and/or covered by small ice crystals.
- It helps to identify intense updrafts in mid-latitude, continental convective clouds.

Limitations

- It works only during the day.
- Pixel colour fades during dawn/dusk when the sun angle is low.
- The yellow colour is a common effect of small ice crystals and cold cloud top temperature.
- It was not designed to provide full cloud analysis. This high clouds-oriented RGB contains very little information about lower level clouds and the surface.
- Snow-covered land might have a similar colour as high clouds with large crystals.
- One has to be careful when using this RGB, to interpret it well. Yellow colour not necessarily means strong updraft or severe storm, see "Good to remember".

Good to remember

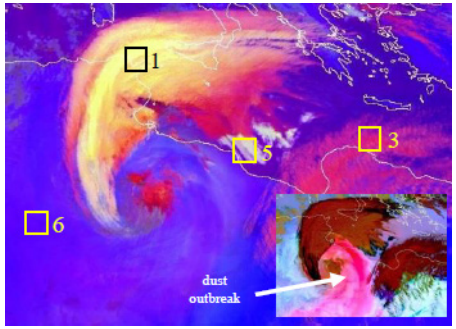
- Small particles at the top of a convective cloud do not necessarily indicate a strong updraft.
  - + A continental convective cloud with a cold cloud base usually has small ice crystals at the top –without a strong updraft
  - + Highly polluted convective cloud (like pyro Cb) usually has small ice crystals at the top – without a strong updraft
- There are some (non-convective) ice cloud types which consist of small ice crystals, like high-level lee clouds or highly polluted cirrus clouds (e.g. dust carried aloft can lead to long-lived small ice particles).

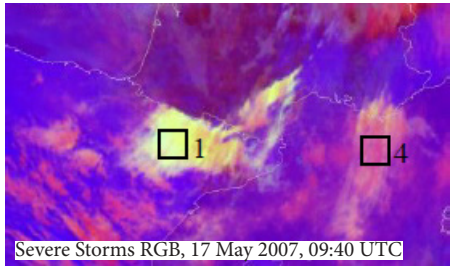
SEVIRI **Severe Storms** RGB QG

1	Thick ice cloud with small ice crystals on the top and/or very cold cloud top (Shades of yellow)
2	Thick ice cloud with large ice crystals on the top and/or not very cold cloud top (Shades of red)
3	Thin ice cloud with large ice crystals (Shades of pink/violet depending on the transparency)
4	Thin ice cloud with small ice crystals (Shades of mauve depending on particle size and cloud transparency)
5	Super-cooled water cloud (Greyish with some green-yellow shades if very cold)
6	No mid or high cloud (Shades of blue or magenta)

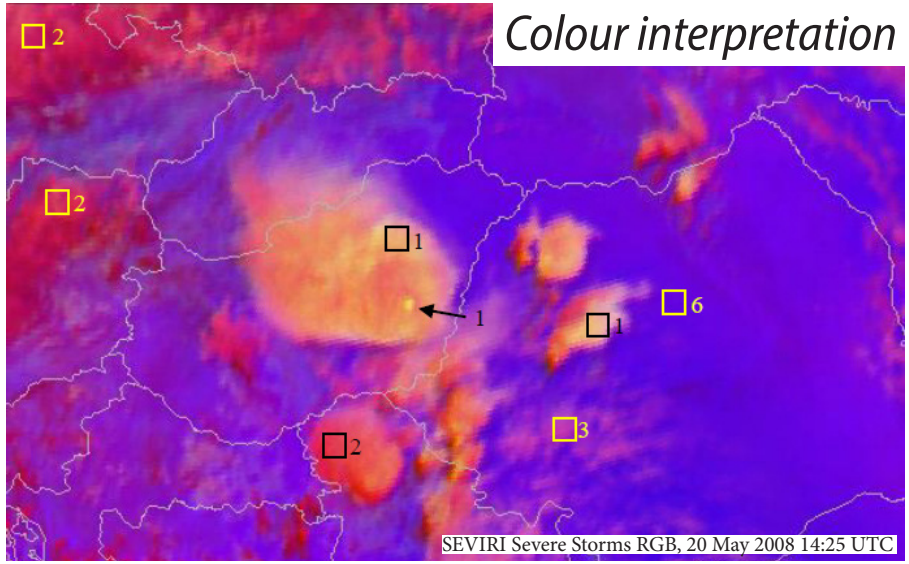
Surface is not seen, low clouds are not or hardly seen. Colours depend on solar and satellite viewing angles, fading with low solar elevation.

Image 1 - below: Severe Storms RGB and Dust RGB (in the corner), 22 February 2007,12:00 UTC



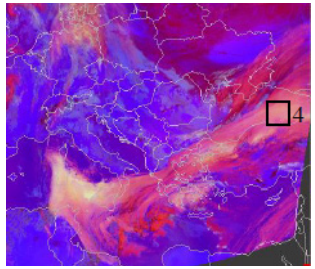


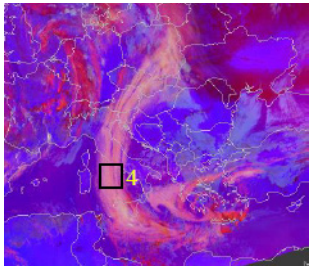
Colour interpretation

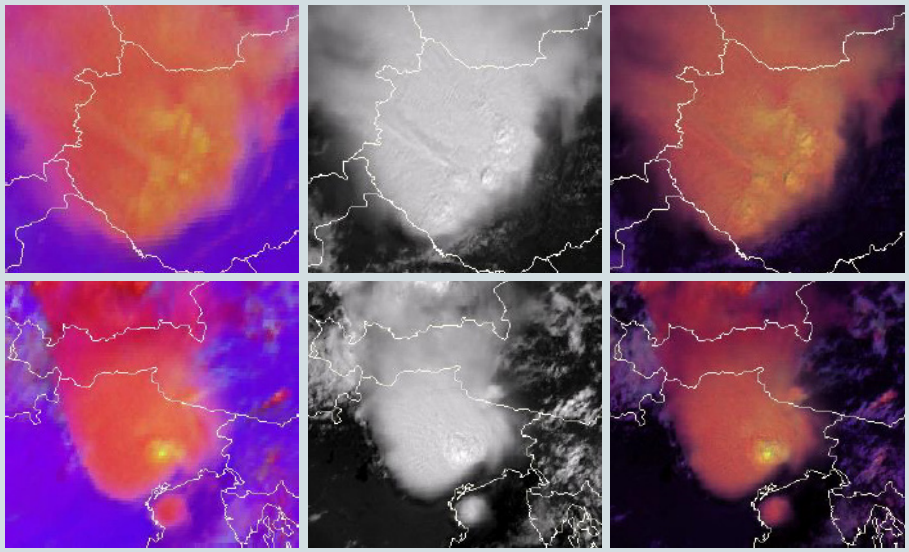


Left: High level lee clouds consist of very small ice crystals.

Right: Severe Storms RGB images, 23 (left) and 24 (right) February 2007, 10:55UTC







Severe Storms RGB (left), HRV (middle), HRV/Severe Storms RGB blended (right) images, 29 June 2006, 10:10 (up) and 12:25 (bottom) UTC

Comparison to other products

The images on the left show Severe Storms RGB and HRV images separately and together: the third column shows blended images composed by the two.

In the HRV image one can see cloud top features, like overshooting tops and an ice plume. In the blended image one can clearly see which cloud top features are yellow(ish). In the bottom row the yellow overshooting top indicates a strong updraft. In the upper row the overshooting tops are yellow, the ice plume is slightly yellowish, and other parts of the anvil are also yellowish. Strong updrafts often bring small ice particles up to the cloud top. The water particles formed at the cloud base do not have much time to become larger by coagulation before freezing. Small particles coming up from the updraft spread along the anvil. Small ice crystals may belong to an above anvil cirrus cloud as well, like Pileus or ice plume. They are also indicators of a strong updraft.

Highly polluted clouds consist of small particles, because of the many condensation nuclei. Image 1 shows a cyclone polluted by dust (see the Dust RGB in its corner, pink colour indicating a dust cloud). The two upper images were taken on the next two days showing remains of the cyclone cloudiness – thin cirrus clouds with very small ice crystals (in mauve shades).

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

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