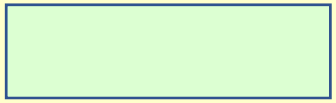
Typical colours of the VIIRS Cloud Type RGB

Thick ice cloud

Medium thin ice clouds

Very thin ice clouds



Lofted water clouds

Water clouds

Sea

Desert

Land

Snow

NPP VIIRS Cloud Type RGB

devised by Andrew Heidinger (CIMSS)

Beam	Channel	Information on
Red	NIR1.38	clouds are seen ahead of a **dark background** (weak water vapor absorption channel)
Green	VIS0.67	cloud optical thickness
Blue	NIR1.61	cloud phase

Colour beam	Channel		Range			Gamma
Red	M9	NIR1.38	0	10	%	1.5
Green	M5	VIS0.67	0	80	%	0.75
Blue	M10	NIR1.61	0	80	%	1

How to use the RGB recipe table?

Colour beam	Channel (difference)	Range			Gamma
Red		MIN1	MAX1	K or %	Gamma1
Green		MIN2	MAX2	K or %	Gamma2
Blue		MIN3	MAX3	K or %	Gamma3

The table contains the needed parameters.

The second column shows which channels (or channel differences) should be visualised in the red, green and blue colours beams.

Before combining them, these images should be calibrated and enhanced.

- The measured values should be calibrated by calculating reflectivity (R) or brightness temperature (BT) values. In case of solar channels the calibration should include solar zenith angle correction as well: the reflectivity should be divided by the cosine of the solar zenith angle. (The zenith angle should be maximise e.g. at 80 degree.)
- The images should be then linearly stretched within the brightness temperature or reflectivity ranges. (The 3rd and 4th columns contain the lower and upper limit of the corresponding ranges, while the 5th column contains the unit. In some cases the range is 'inverted': the MAX and the MIN values are reversed.)
- A so called gamma correction is performed, if needed. If gamma is equal to 1 then no gamma correction is needed. (The 6th column contains the Gamma parameter.)

How to perform the Gamma correction?

The enhancement expand the range (MIN, MAX) of R or BT values to the full range of display values (0-255, BYTE) by a linear stretching and a possibly non linear expansion.

$$\boldsymbol{BYTE = 255 * \left(\frac{X - MIN}{MAX - MIN}\right)^{\frac{1}{Gamma}}}$$

where

X is the input value - the actual calibrated value: reflectivity (R) or brightness temperature (BT),

MIN and MAX are the lower and upper limit of the range of the stretching,

Gamma is the parameter of the gamma correction,

BYTE is the output value – the intensity of the enhanced image (if the full range of display value is 0-255)