

FCI 0.44 μm channel Quick Guide

Also called: VIS0.4, blue band.

Applicability: Daytime only.

Used for (together with other channels): Daily observation of Earth features. Monitoring **aerosols** (smoke, dust, volcanic ash, smog); monitoring changes in surface features (water (algae blooms, sediment, etc.) and vegetation); monitoring clouds.

Used in: True Colour RGB and derived products.

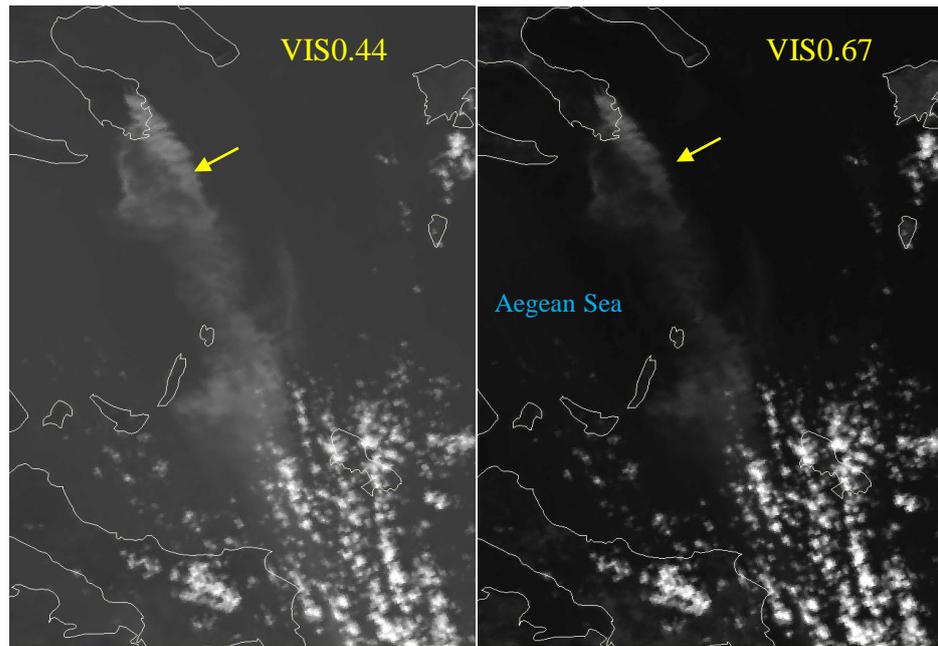
Channel Characteristics: The 0.44 μm band measures reflected and scattered solar radiation. Strong scattering by molecules, aerosols, and cloud particles occurs, due to the short wavelength.

Benefits: Located in a chlorophyll absorption region, it indicates plant health. Aerosol plumes are well detected over both land and water surfaces and easily distinguished from brighter clouds. The 1 km spatial resolution enables improved detection of smaller features.

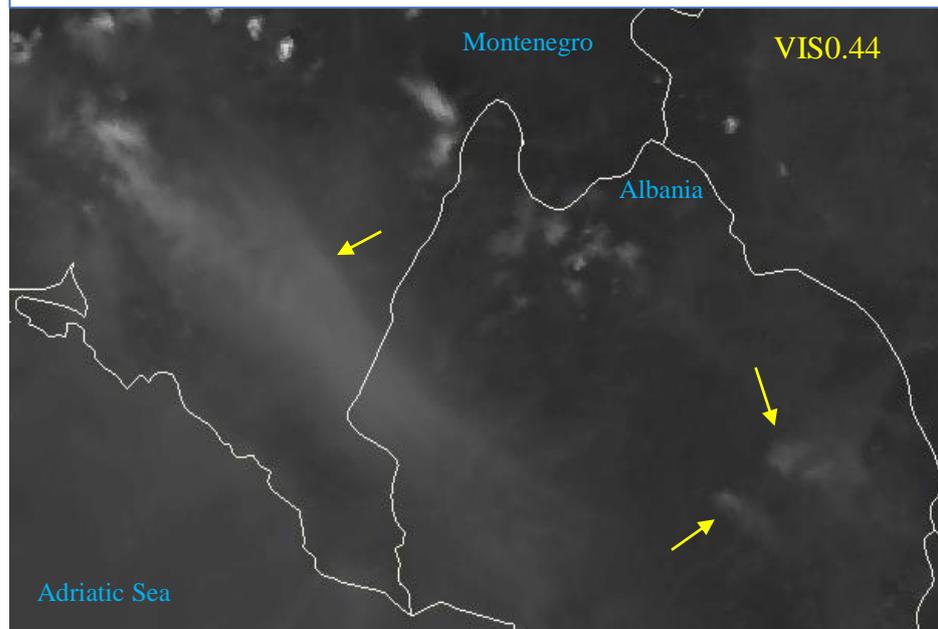
Limitations: Daytime information only. Rayleigh correction recommended.

Scattering by atmospheric gas molecules is strong in the blue spectral region, so the images appear hazy. In order to retrieve aerosol loading or visualize surface properties, Rayleigh correction is necessary. The effect of **aerosol scattering** is also considerable. Aerosol plumes are seen not only over sea but also over land (which is relatively dark in this channel); see the lower image on the right. **Smoke** usually consists of fine particles and is often better seen in the VIS0.44 channel than in the VIS0.67 channel; see the upper image pair.

The graph on the right shows **atmospheric transmittance** in the visible and near-infrared spectral region. At shorter wavelengths the **effect of molecular scattering** is seen; the shorter the wavelength the stronger the effect. (See also the upper image pair: the VIS0.44 image is hazier than the VIS0.67 image.) The blue and red bars on the graph indicate the **spectral region of the FCI VIS0.4 and VIIRS M2 channels**. In this guide, the VIIRS M2 band is used as a proxy band for the future FCI VIS0.4 channel. MODIS and Sentinel OLCI data might be also used as proxy data over Europe.

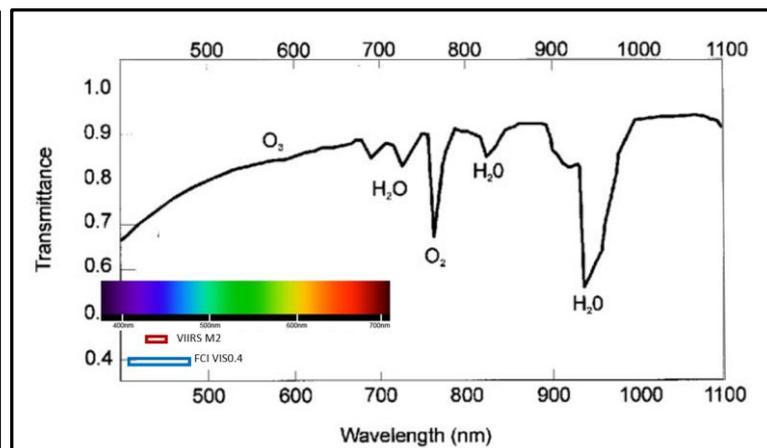


Smoke plume over the Aegean Sea, Greece. VIIRS 0.44 and 0.67 μm images for 25 October 2018, 10:43 UTC.



Smoke plumes over land. VIIRS 0.44 μm image, 10 August 2021, 11:08 UTC

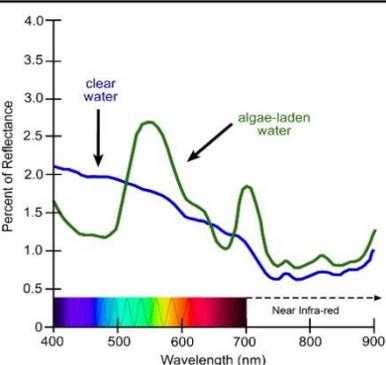
FCI Band	Central Wavelength	Spectral Width	Spatial Sampling Distance	Spectral Characteristic	Units
1	0.444 μm	0.060 μm	1 km	Visible blue spectrum	[%]



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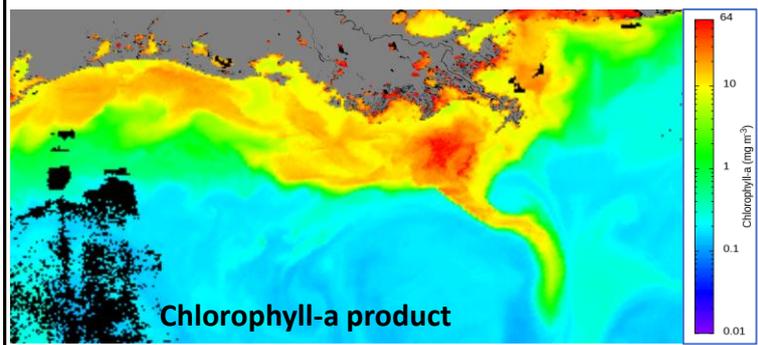
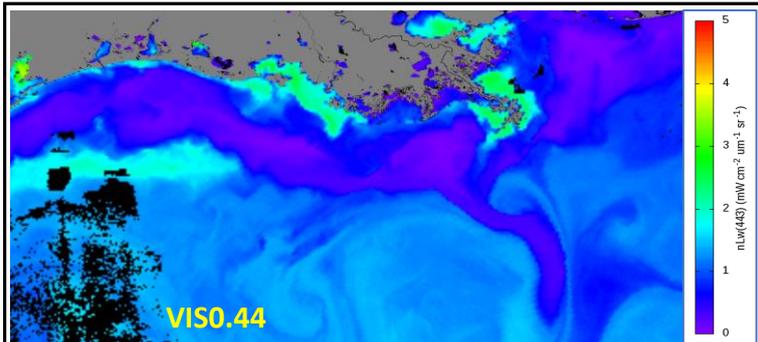
Applications and Examples

The 0.44 μm channel, along with other visible and near-infrared channels, is used to retrieve the chlorophyll content of near-surface water, since chlorophyll absorption is strong in the spectral range of this channel. The NOAA-20 VIIRS images on the right, from 17 April 2018, show the Mississippi River outflow region into the Gulf of Mexico.



If the water contains a large amount of chlorophyll-a, the 0.44 μm reflectance can be lower than that of clear water (see the graph on the left), as seen in the upper right image.

Reflectance of clear and algae-laden water for a typical phytoplankton bloom, where low reflectance (high absorption) indicates high chlorophyll concentration.



Normalized water-leaving VIIRS M2 channel (VIS0.44) radiance (top) and retrieved chlorophyll-a amount (bottom). (Products of NOAA STAR Ocean Colour Research Team visualised by the OCView tool.)

Use in RGB Imagery

The 0.44 μm channel is used in the **True Colour RGB**, in the blue colour beam (after correcting for the effect of Rayleigh scattering).

The True Colour RGB distinguishes vegetated land from bare soil and land from water. It provides information on sea surface water composition by distinguishing clear water from, e.g., algae-laden water or water with sediment. It detects aerosol plumes (e.g., dust, smoke, volcanic ash, smog).

Aerosol plumes usually appear grey, as aerosol scattering does not depend strongly on wavelength. As *smoke* consists of fine particles, it may appear slightly bluish (strongest scattering in the blue channel), while *dust* cloud, consisting of coarser particles, may appear slightly brownish (strongest scattering in the red channel). The 0.44 μm channel provides useful information for identifying green vegetation, as areas covered by green vegetation are dark in the blue channel due to strong chlorophyll absorption.



VIIRS True Colour RGBs; smoke plumes over the Aegean Sea, 25 October 2018 (above) and 10 August 2021 (upper right) and dust cloud over the Mediterranean Sea (right), 10 August 2021.

Note that the above image (smoke plume over the Aegean Sea) shows the same scene as the upper image pair on the first page.



See also:
[ABI Band 1 Quick Guide](#)
[EUMeTrain True Colour RGB Quick Guide](#)