

FCI Channel 2.25 μm Quick Guide

Band Name: Cloud Particle Size

Applicability: Daytime for cloud microphysical properties, day- and nighttime for fire detection.

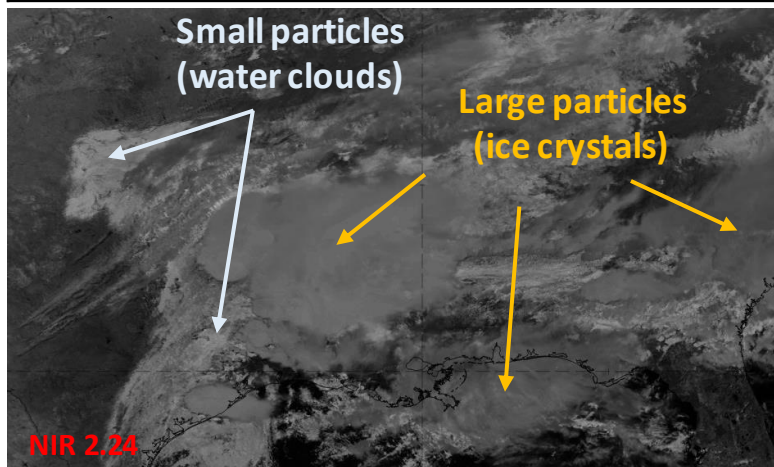
Used for: Retrieve cloud optical depth, cloud particle size and cloud phase, snow and fire monitoring, aerosol and smoke detection.

Used in: Cloud Phase RGB, Fire Temperature RGB, fire radiative power products, cloud masks.

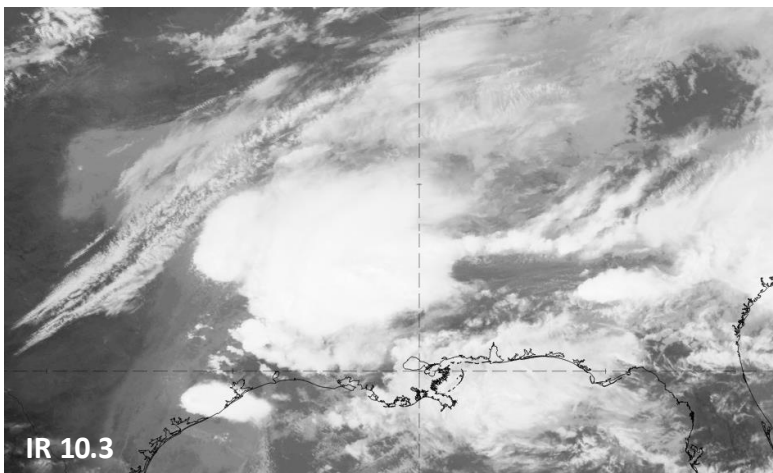
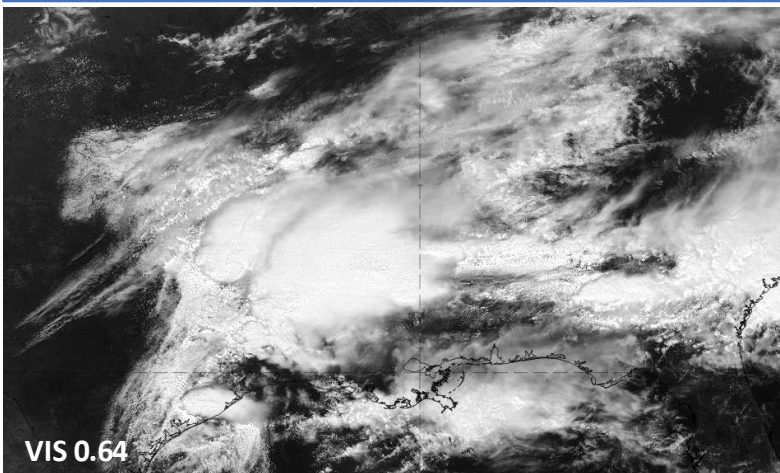
Channel Characteristics: During daytime, the 2.25 μm band detects reflected solar radiation; during nighttime, radiation emitted from wildfires is detected. The channel is sensitive mainly to the particle size and only slightly to the water/ice phase of the cloud particles.

Benefits: Information about cloud microphysical properties. Higher horizontal resolution during rapid scan mode.

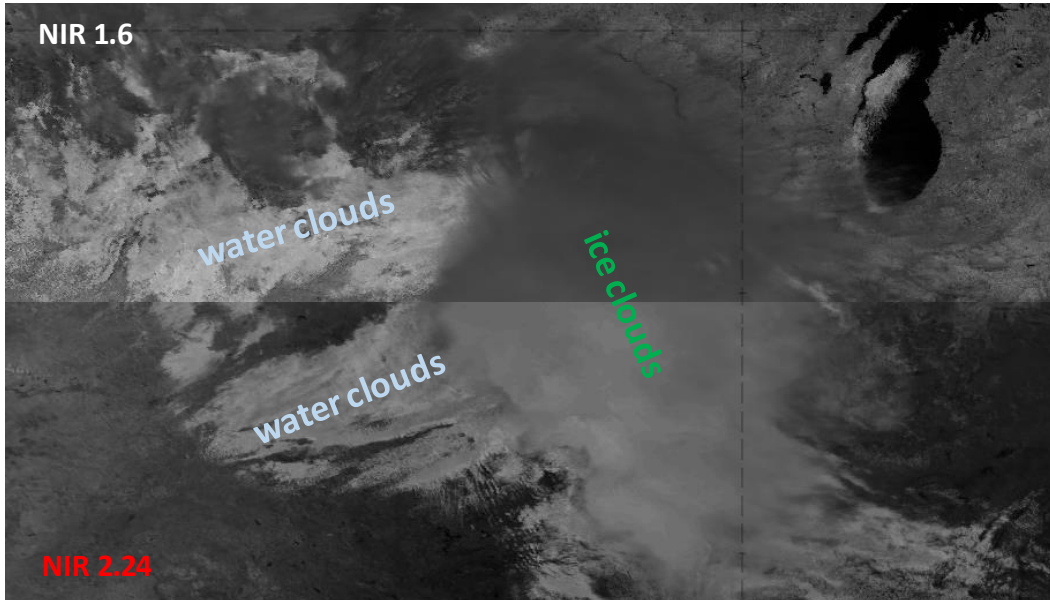
GOES-16 ABI sensor (used here as proxy for FCI data); NIR 2.24 image from February 20, 2020 at 18:00 UTC.



Limitations: Particle size and cloud phase estimation only in connection with other bands (0.64 and 1.6 μm respectively). Clouds on top of fires can block the view. Less surface information than provided by VIS channels.



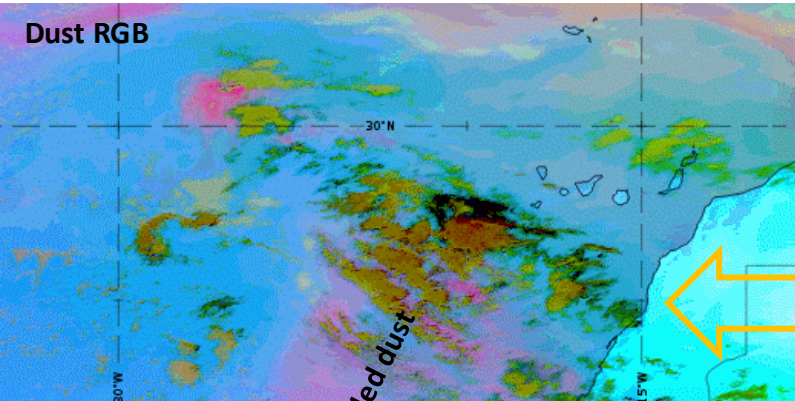
FCI Band	Central Wavelength [μm]	Spectral Width	Spatial Sampling Distance	Spectral Characteristic	Units
8	2.250 μm	0.050 μm	Full disk scan 1 km Rapid scan 0.5 km	Near-Infrared	[%]



GOES-16 ABI sensor; NIR 1.6 and NIR 2.24 split image from May 4, 2020 at 18:00 UTC

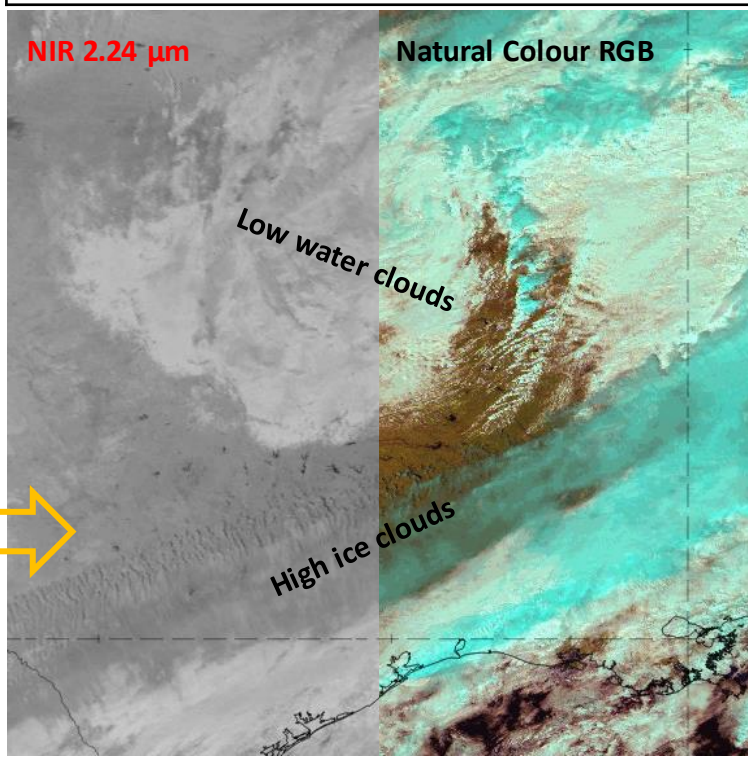
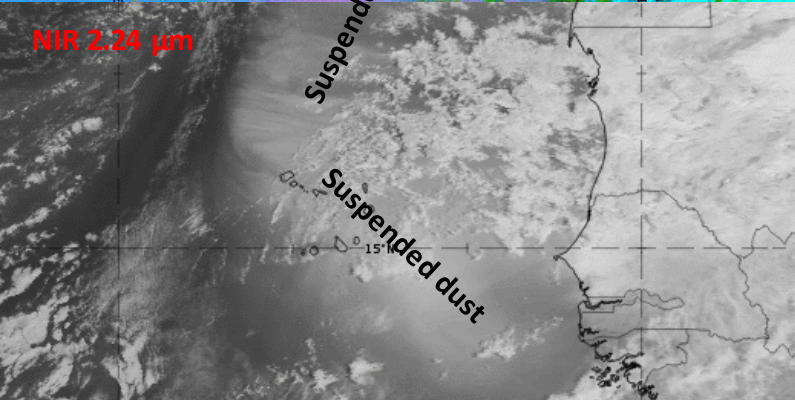
The images on the left illustrate the difference in reflectivity of ice crystals and water clouds for the NIR 1.6 and NIR 2.24 channels. It can be seen that the NIR 1.6 channel is more sensitive to cloud phase, while NIR 2.24 is better at differentiating cloud particle size (compare the area with ice clouds in the two images). This is why both channels are used in the Cloud Phase RGB.

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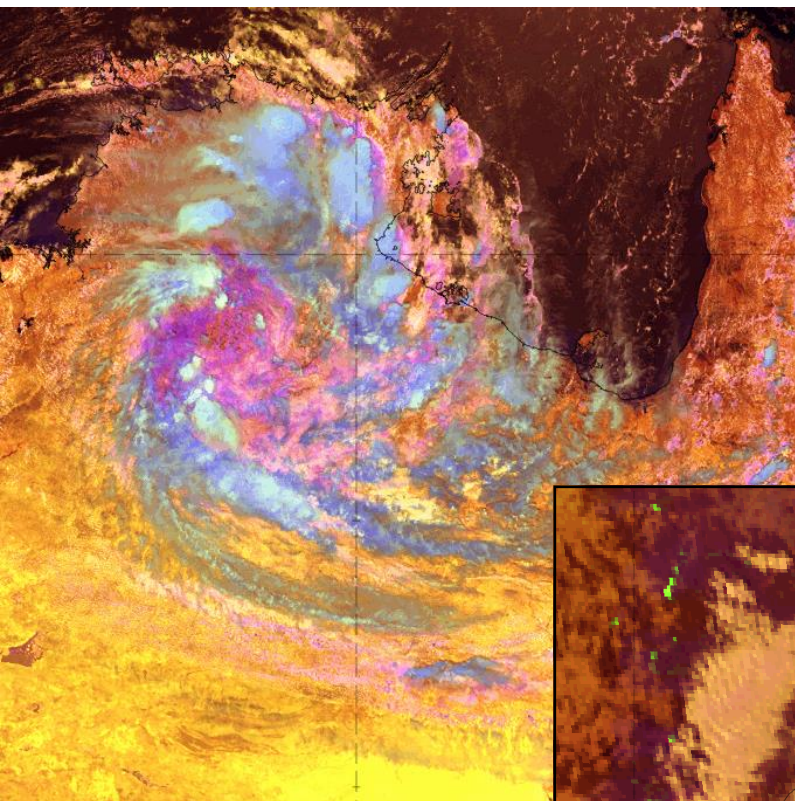
Applications and Examples

25 February 2020 at 12:00 UTC, eastern Atlantic. Comparison of the 2.24 μm band with the Dust RGB (both from the GOES-16 ABI sensor) shows its strong ability to detect sand and aerosols in the atmosphere during daylight hours. While dust is shown in magenta hues in the Dust RGB, the 2.24 μm channel has a diffused area of bright shading showing reflected solar radiation.



24 February 2020 at 18:00 UTC, United States. At 2.25 μm , high ice clouds reflect less solar radiation than low water clouds. The images on the right illustrate the ability of the 2.25 μm channel to differentiate between ice and water clouds (though not as well as NIR 1.6 μm).

Tropical cyclone Esther over Australia's Northern Territory. Advanced Himawari Imager (AHI), **Cloud Phase RGB** from February 26, 2020 at 03:00 UTC.



Use of channel 2.25 μm in RGB Imagery

The combined use of NIR 2.25 and NIR 1.6 μm strongly increases the ability of the **Cloud Phase RGB** to separate ice from water clouds and additionally provides information on cloud particle size. While blue shades indicate ice clouds, light yellow, pink and magenta colors signify water clouds. Pink and blue shades reflect cloud particle size distribution. The signal from the green color beam (2.25 μm) is particularly strong in the case of wildfires, as can be seen in the lower right image (Bushfires in New South Wales, Australia, December 16, 2019 at 06:00 UTC).

See also:
[ABI Band 6 Quick Guide \(CIMSS\)](#)
[GOES-16 Band Reference Guide](#)
[GOES-R ABI Fact Sheet Band 6](#)
[EUMeTrain Cloud Phase RGB Quick Guide](#)
[Fire Temperature RGB Quick Guide](#)