# FCI Channel 1.38 µm Quick Guide

**Band Name: Cirrus band**

**Applicability**: Daytime use only

**Used for**: Detection of thin high-level cirrus clouds

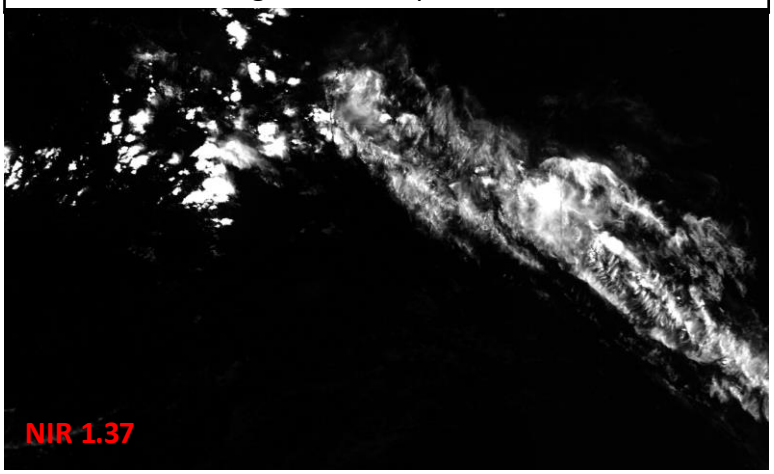
**Used in**: Cloud Type RGB, cloud mask product, wind retrieval, volcanic ash monitoring, contrail detection

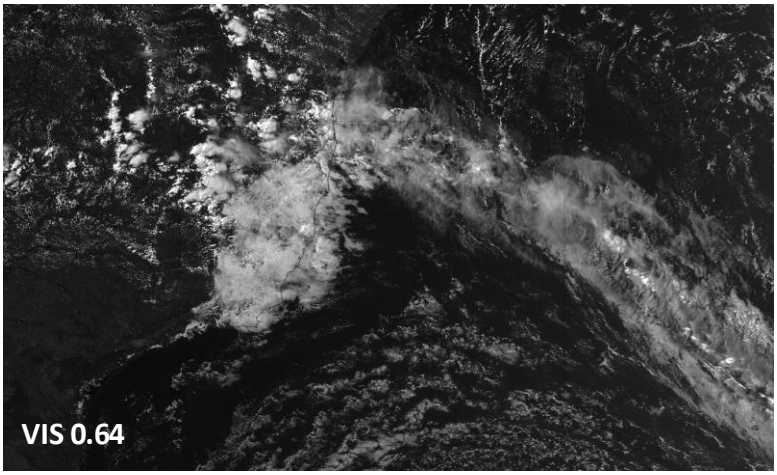
**Channel Characteristics**: The 1.38 µm band detects reflected solar radiation. At this spectral wavelength, solar radiation is strongly absorbed by water vapor. In a humid atmosphere, only high clouds are seen. In a very dry atmosphere, low clouds (or snow on mountains) can be seen. The intensity of reflected solar radiation strongly depends on cloud height.

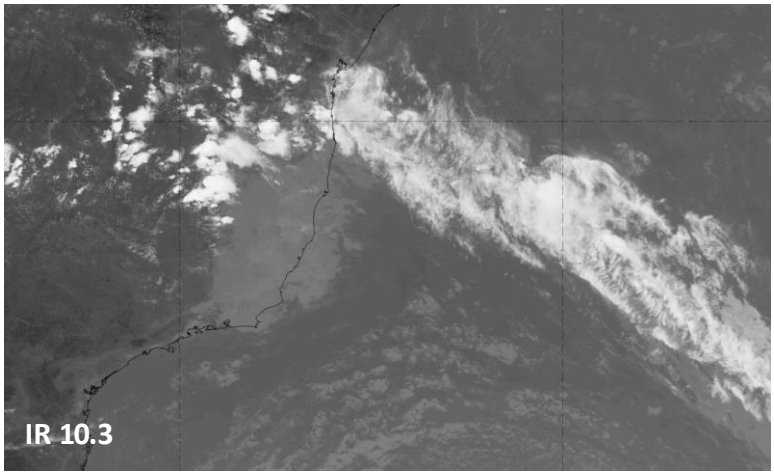
**Benefits**: Best cirrus detection among daylight (VIS/NIR) channels. A coarse cloud height attribution is possible.

**Limitations**: The optical depth, i.e. the vertical extent of the upper-tropospheric layer in which clouds are visible, depends for this spectral channel on the water vapor content.

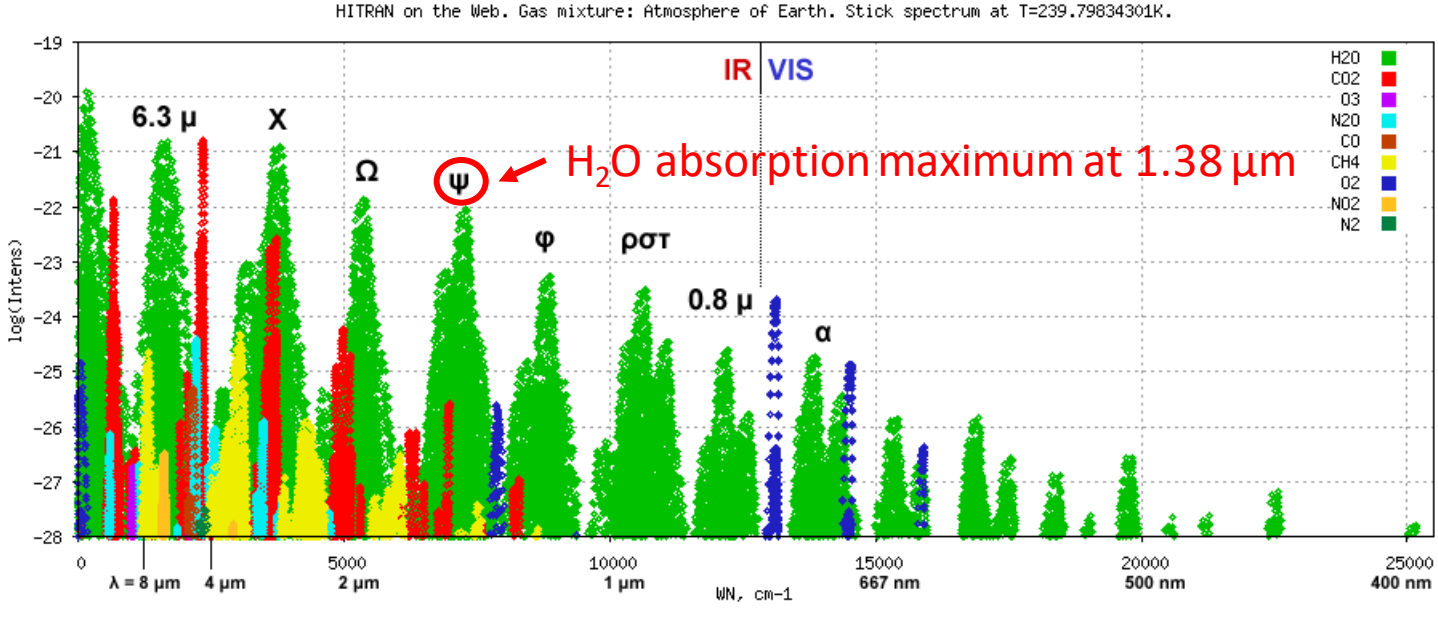
GOES-16 ABI sensor (used here as proxi for FCI data); spectral channel comparison for April 5, 2020 at 18:00 UTC (Region: Brazil and Southern Atlantic).
NIR1.37 only detects high-level thin and thick cirrus clouds. Low level clouds are not seen in this spectral channel due to high VW absorption.




| FCI Band | Central Wavelength [µm] | Spectral Width | Spatial Sampling Distance | Spectral Characteristic | Units |
|---|---|---|---|---|---|
| 6 | 1.380 µm | 0.030 µm | 1 km | Near-Infrared | [%] |



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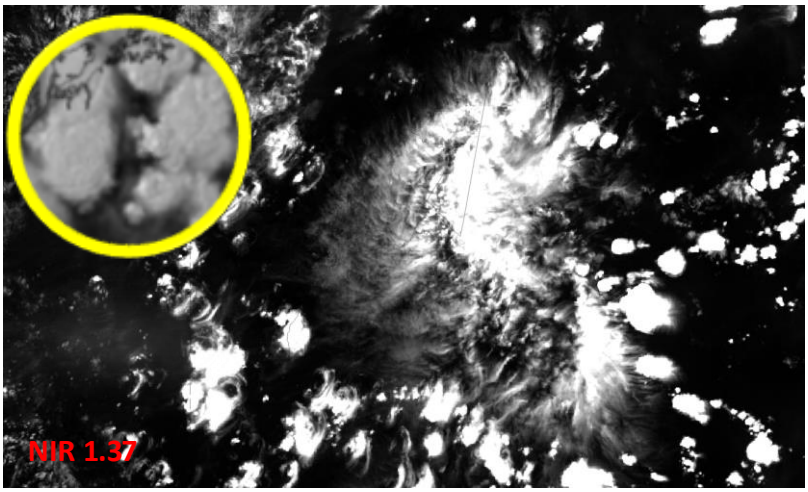
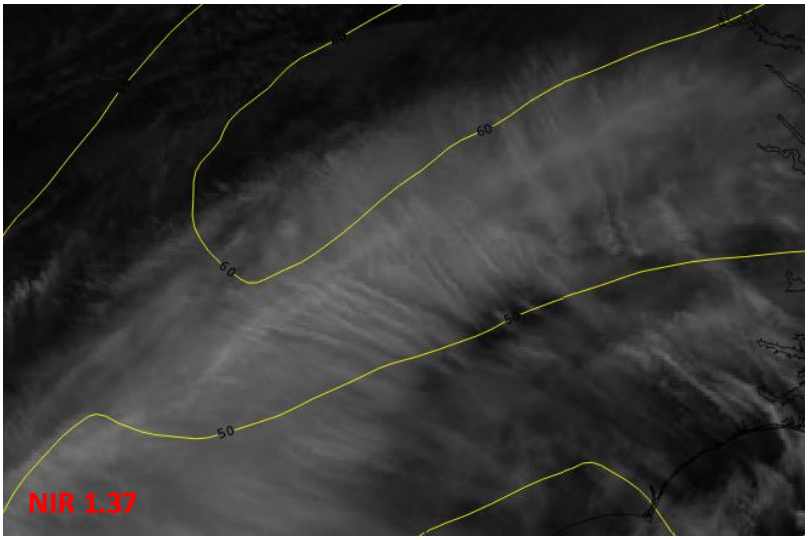


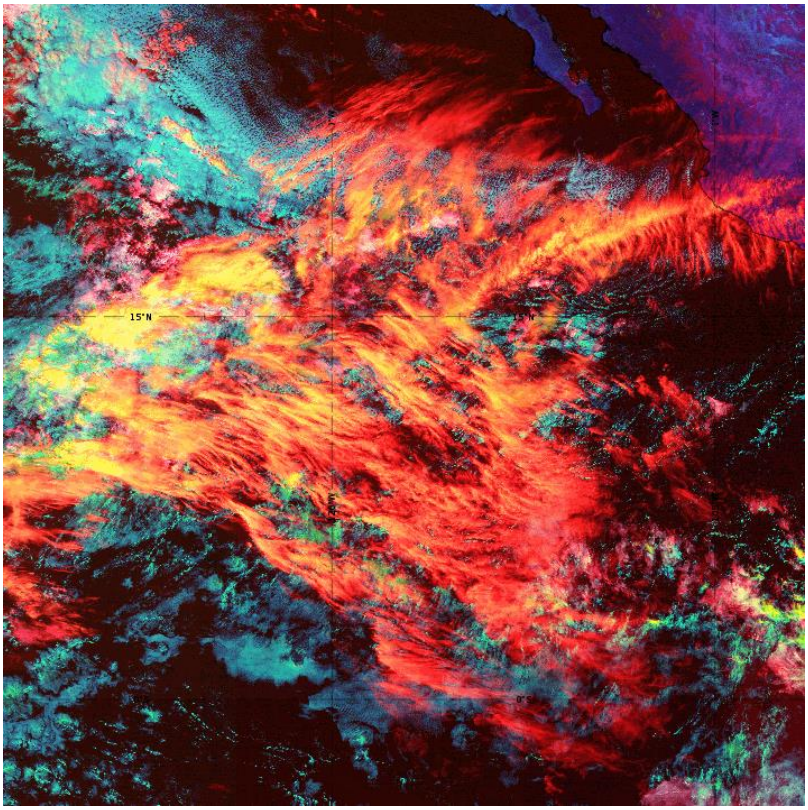

## Applications and Examples

**Convection** over South-America (April 5, 2020 at 18:00 UTC, GOES-16 ABI sensor).
Cloud tops and cirrus anvils near the tropopause effectively reflect solar radiation (up to 80%); low and mid-level cloudiness are invisible in a moist atmosphere. Depending on image enhancement, overshooting tops can also be seen (cloud shadows in the case of low sun elevation). In combination with other spectral channels, FCI band NIR1.38 offers additional information on upper level moisture.




**Transverse cloud bands** over eastern North America (February 16, 2020 at 18:00 UTC, GOES-16 ABI sensor, isotachs at 300 hPa in yellow).
These cloud bands are often seen as substructures in high-level thin cirrus cloud bands accompanying the subtropical jet stream. These fiber-like cloud bands are oriented perpendicular to the subtropical jet axis and consist of thin ice clouds. Transverse cloud bands are often associated with turbulence at jet-level. They can be perfectly observed in the NIR1.38 channel because solar radiation at the top of the troposphere is strongly (40-50%) reflected by the ice crystals.

Below: GOES-16 ABI sensor; **Cloud Type RGB** from February 6, 2020 at 18:00 UTC.



## Use in RGB Imagery

In the **Cloud Type RGB**, the 1.38 µm channel is represented by the red color beam. It discriminates thin high-level cirrus clouds better than any other RGB using daylight channels and shows comparable results to the split-window technique (IR12.0-IR10.8) used, for example, in the Dust RGB. Due to water vapor absorption, there is a strong correlation between reflectance and cloud height. In a very dry atmosphere, clouds from the mid- troposphere may have the same reflectance as high cirrus clouds. At this wavelength, ice crystals reflect less solar radiation than water droplets, but this effect is of minor importance since most high-level clouds are ice clouds.

See also:
ABI Band 4 Quick Guide (CIMSS)
GOES-16 Band Reference Guide
EUMeTrain Cloud Type RGB Quick Guide