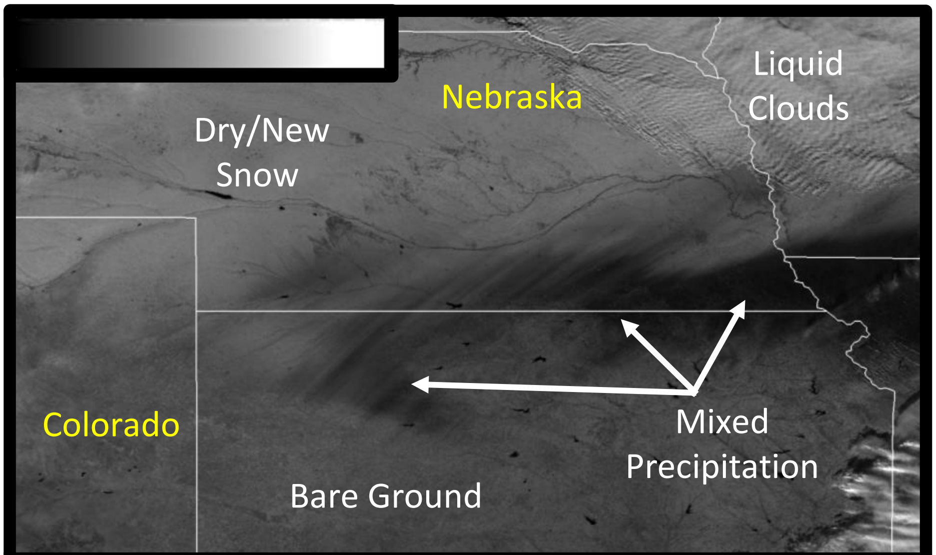
VIIRS M-8 Band (1.24 μm)

Quick Guide

Why is the VIIRS 1.24 μm Important?

The 1.24 μm (VIIRS Moderate Band 8 [M-8]) is at 750-m spatial resolution and is highly sensitive to snow and ice properties. The 1.24 μm band is unique in that this spectral channel is not available on any existing geostationary platform. This solar reflective band is highly sensitive to surface properties of snow, including snow grain size and wetness, and is useful for discriminating fresh snow from old snow, snowmelt and accumulations of freezing rain and sleet. Many other features appear similar to the 0.86 μm “veggie” band.



VIIRS 1.24 μm at 1915Z, 30 December 2020; satellite overpass of mixed precipitation (e.g., freezing rain, sleet, wet snow) over the central high plains.

VIIRS 1.24 μm Attributes and Resolutions

VIIRS Band	Central Wavelength (μm)	Type	Spatial Resolution	Temporal Resolution	Data Latency
M-8	1.24	Near-infrared	750-m	**CONUS:** ~2x / day per polar-orbiting satellite **Alaska:** more frequent overpasses near the poles	**Direct Broadcast (DB):** ~30-min **Satellite Broadcast Network (SBN):** 1 to 1 ½ h

Impact on Operations

Primary Application

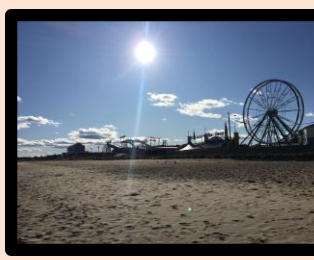
Snow Properties: Fine grain and/or dry snow is more reflective at 1.24 μm than large grain or wet snow. This allows for the detection of fresh snow on top of old snow, melting snow, and rain on snow.

Mixed Precipitation: Areas of freezing rain and/or sleet are poorly reflective and appear dark.

Land and Clouds: In general, vegetation, bare ground, clouds and water are similar in appearance to the 0.86 μm “veggie” band. Thus, burn scars, flooding and clouds may be monitored with this channel.

Limitations

Daytime Only: This channel detects reflected solar energy, and is therefore only useful during the day.



Land Surface Properties: Depending on its surface properties, snow may have a similar reflectance to the surrounding land surface, and may be difficult to detect using the 1.24 μm channel alone. This is mitigated through use of the Snowmelt (or similar) RGB.

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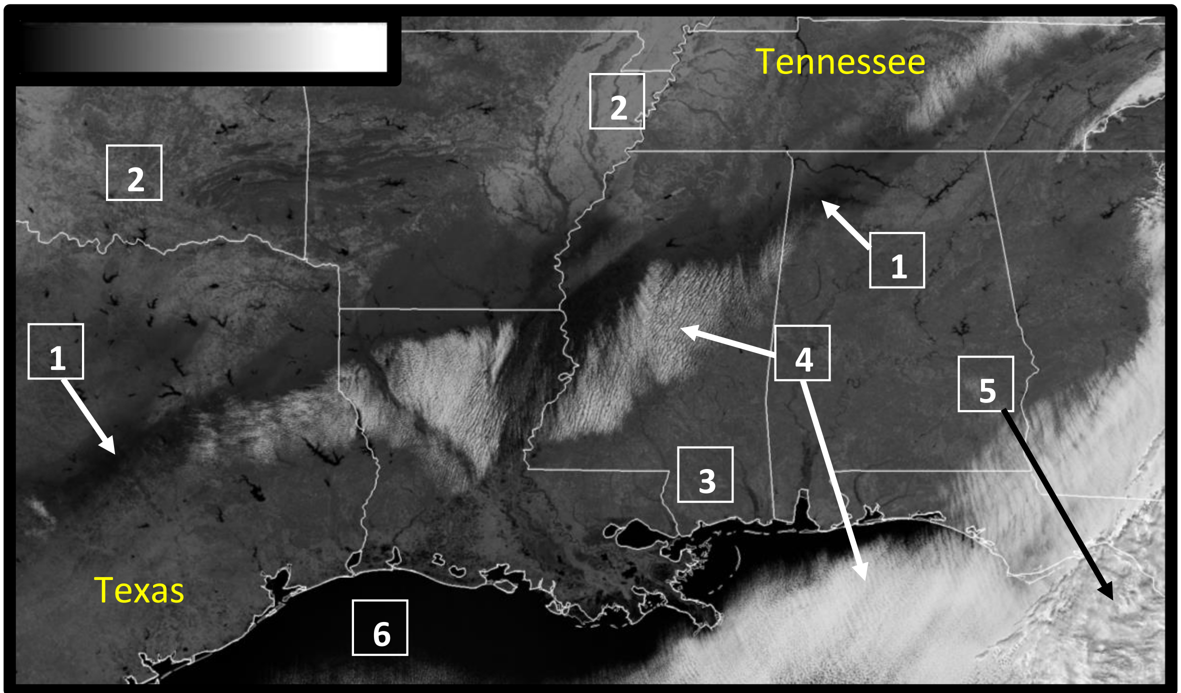
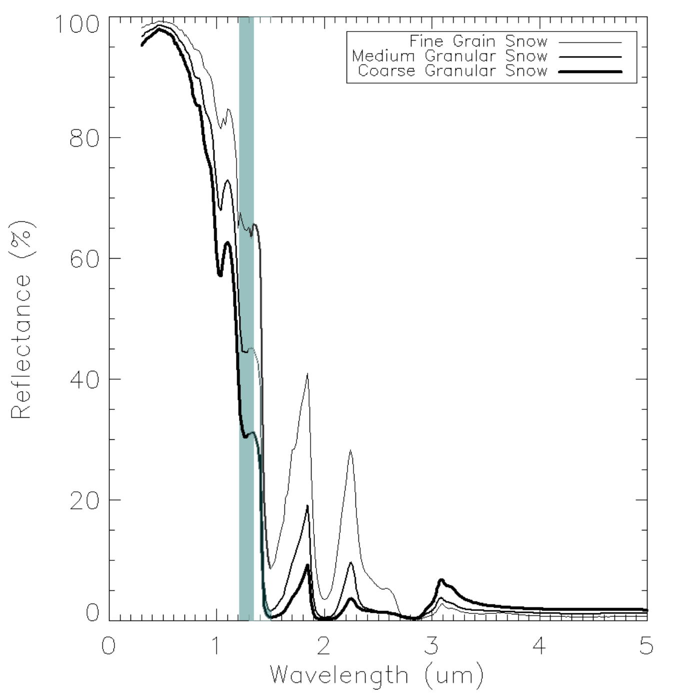
Image Interpretation

1. **Wet/Old Snow, Mixed Precipitation (sleet, freezing rain)**
2. **Dry/New Snow**
3. **Bare Ground**
4. **Liquid Clouds**
5. **Ice Clouds**
6. **Bodies of Water**



VIIRS 1.24 µm observations of mixed precipitation over the Lower Mississippi River Valley on 19 February 2021.



<u>1.24 µm Spectral Response Function</u>

The graph (left) highlights the reflectance spectra of snow as a function of wavelength and snow grain size. Snow is highly reflective in the visible spectrum, however snow absorbs in the shortwave and mid-wave infrared (IR) and appears dark in the imagery. The 1.24 µm (bandwidth seen in aqua) acts as a transition zone between the visible and IR where snow is highly reflective to highly absorbing. In relation to grain size, as snow particles gets smaller, snow becomes more reflective at 1.24 µm. Larger particles are less reflective. This is true for snow wetness as well: wet snow is less reflective than dry snow.

Resources:

JPSS VIIRS Imagery and Visualization Team Blog

The Mystery Channel

Satellite Book Club Seminar Series

Introduction to the VIIRS Snowmelt RGB

CIRA SLIDER

Near-Real Time VIIRS 1.24 µm Imagery

Hyperlinks not available when viewing material in AIR Tool