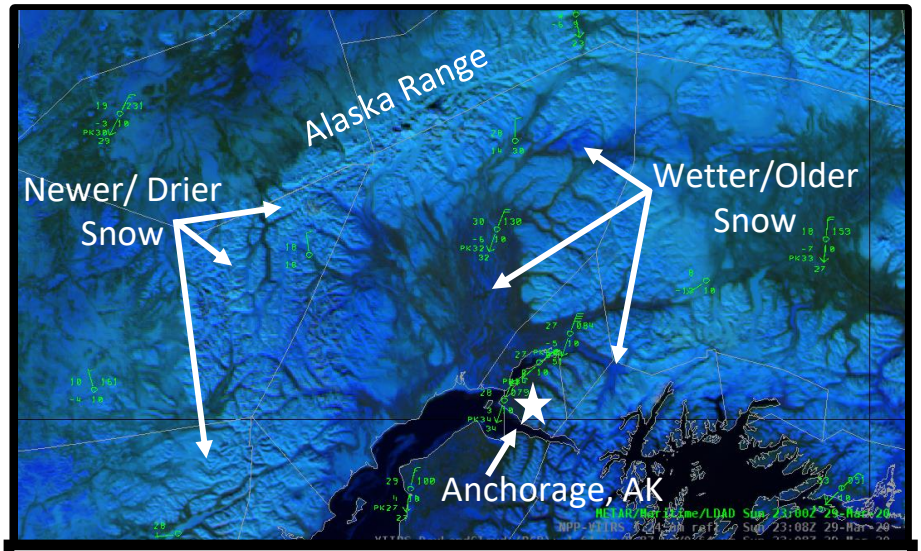
VIIRS Snowmelt RGB Quick Guide

Why is the VIIRS Snowmelt RGB Important?

The 750-m SNPP and NOAA-20 VIIRS Snowmelt RGB is used to monitor snow on the ground and differentiate the microphysical characteristics of clouds (liquid versus ice). Specifically, this RGB utilizes the VIIRS 1.24-µm band that is highly sensitive to snow properties, including grain size and relative wetness. This RGB is useful for identifying areas of freezing rain and sleet accumulation, as well as for hydrological applications, such as snowmelt-enhanced flood events.



SNPP VIIRS Snowmelt RGB at 2308Z, 29 March 2020; satellite overpass of southern Alaska. The cyan mountainous regions indicate newer or drier snow, whereas the dark blues in the valleys indicate wetter or older snow.

VIIRS Snowmelt RGB Recipe

Color	Band (µm)	Min-Max Gamma	Physically Relates to…	Small contribution to pixel indicates….	Large contribution to pixel indicates…
Red	1.61 (M-10)	0 to 100% 1	Discriminaton of ice and snow from clouds	Ice and snow, ice clouds, water	Liquid clouds, bare soil
Green	1.24 (M-8)	0 to 100% 1	Snow grain size, cloud particle size	Old, wet or melting snow, sleet/freezing rain	Clouds, fresh or fine snow, vegetation, bare soil
Blue	0.67 (M-5)	0 to 100% 1	Clouds, ice and snow	Bare ground, water	Clouds, snow, ice

Impact on Operations

Primary Application

Snowmelt: RGB can infer regions of wet snow caused by solar insolation or via mixed precipitation (i.e. sleet, freezing rain) falling onto the surface. Indications of snowmelt may be a precursor to increased runoff and flood potential.

Particle Size / Snow Age: Smaller or drier snow grains will appear brighter in the 1.24-µm band, while larger flakes or wetter snow are darker. As snow ages, it's reflectance will gradually decrease over time. Fresh snow may be visible on top of old snow.

Microphysics of Clouds: Clouds are similar in appearance to the Day Land Cloud RGB. Liquid clouds appear white, while ice clouds are shades of cyan.

Limitations

Forests and Clouds: Trees in forested regions may obscure the snow signal. Clouds may also conceal surface features.

Daytime Only: RGB depends on solar reflectance from the visible and near-IR band. Imagery is not available during the nighttime.

Temporal Resolution / Latency: RGB imagery is available ~2x / day per polar-orbiting satellite over CONUS. Note, more frequent overpasses are viewable near the poles (i.e. Alaska). Data latency is ~30 minutes.

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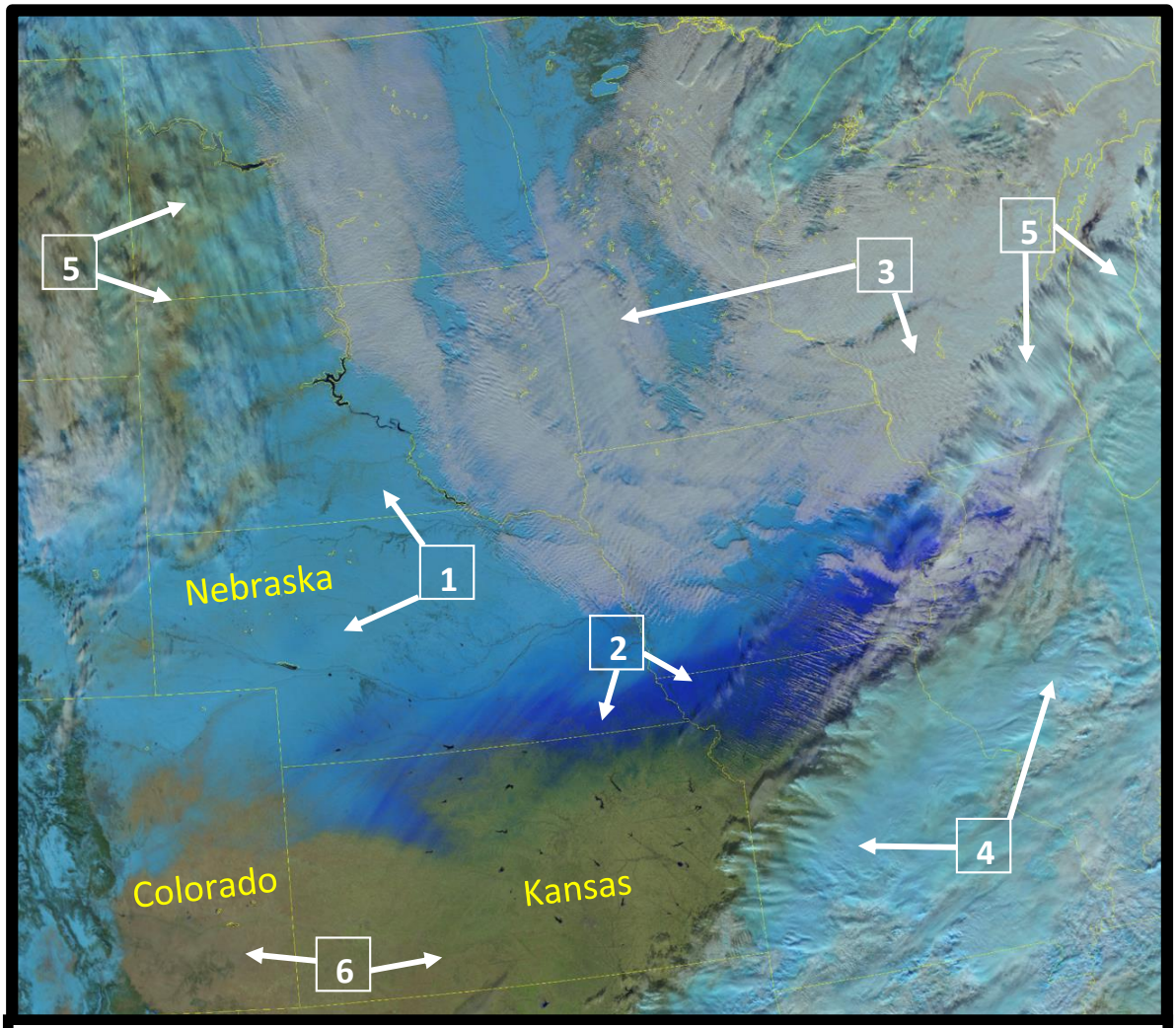
Quick Guide

RGB Interpretation

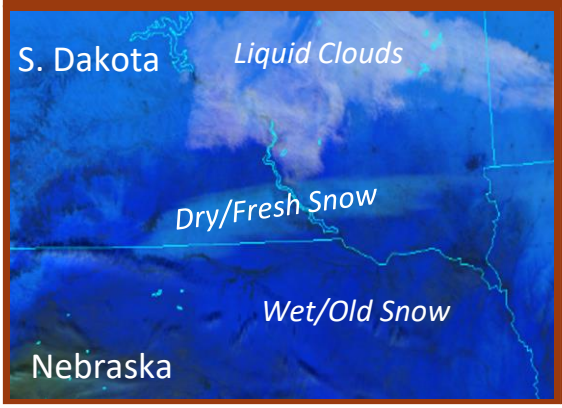
- **1** Dry or New Snow – fine or medium grain (cyan)
- **2** Wet or Old Snow - coarse grain, sleet, freezing rain (dark blue)
- **3** Low, liquid clouds (white)
- **4** Thick ice clouds (shades of cyan)
- **5** Thin ice clouds (bluish-white, fibrous texture)
- **6** Bare Ground, Vegetation (brown to green)

Note: colors may vary diurnally, seasonally, and latitudinally.



Snowmelt RGB observations of mixed precipitation (sleet and freezing rain in dark blue) over the Plains.

Comparison to VIIRS Day Land Cloud RGB: Over the northern high plains, a swath of new, dry snow, and of wet snow are discernible in the VIIRS Snowmelt RGB (bottom-left). This RGB employs the 1.24-µm band (in the green component) that is sensitive to snow microphysical properties. In contrast, the VIIRS Day Land Cloud RGB (bottom-right) employs the 0.86-µm band, which is more sensitive to vegetation than differences between fresh, dry snow and wet snow.



Resources:

JPSS VIIRS Imagery and Visualization Team Blog
The Mystery Channel

CIRA SLIDER
Near-Real Time VIIRS Snowmelt RGB Imagery

Hyperlinks not available when viewing material in AIR Tool