Day Snow/Cloud Layers

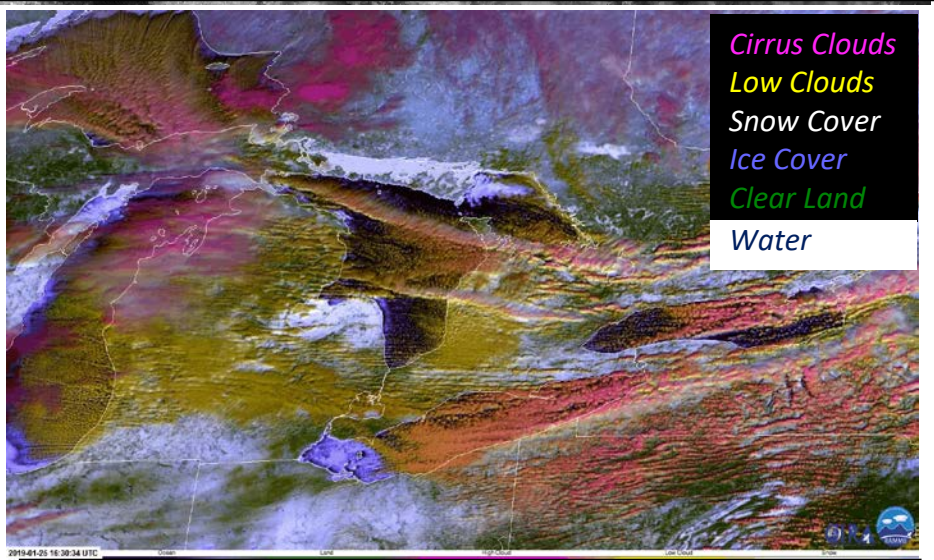
Quick Guide

Why is the Day Snow/Cloud Layers Important?

The Day Snow/Cloud Layers combines information from 6 different bands on the GOES ABI (6 during the day and 1 at night) to help distinguish clouds from snow and ice. This is a daytime only product for snow/cloud discrimination. At night, a single IR band is used to provide cloud information only. Unlike other RGB snow/ice products, snow is portrayed in a more intuitive color – white. Also, this product discriminates between low and high clouds.

Daytime bands: 0.47, 0.64, 1.38, 1.61, 2.25, 10.3 µm.

Nighttime band: 10.3 µm.



Daytime image of the Day Snow/Cloud Layers from GOES-16 over the Great Lakes region at 1630 UTC, 25 January, 2019

Day Snow/Cloud Layers comprised of Day and Night Algorithms

Day	The daytime algorithm uses combinations of reflective and infrared bands on GOES, that includes a cirrus mask from the 1.38 µm channel, and a normalized difference snow index (NDSI). The blue (B) color comes from scaled combinations of 0.64 µm, 1.38 µm, 2.25 µm, and NDSI. Green (G) is a combination of 0.47 µm and 1.38 µm. Red(R) is a scaled combination of 0.47 µm, 1.38 µm and 10.3 µm. Snow is highlighted in all three colors (white), low liquid clouds contribute to R and G (yellow / green), high clouds appear in B and R (pink).
Night	At night, we lose information from the visible and near-infrared bands and the product simply becomes the 10.3 µm IR band.

Impact on Operations

Primary Application

Snow: The product helps identify snow, which is difficult to do using traditional IR methods. Most other snow RGBs depict snow in a color other than white, therefore snow appears in a more visually intuitive color in this product.

Ice on water bodies: Ice coverage over water bodies appear white to blue color.

Low Clouds and Fog: Low clouds appear yellowish-green, making them easy to distinguish from the white snow.

Cloud Layers: High clouds appear pink to magenta and mid-level / mixed phase clouds appear various shades of orange.

Limitations

Daytime only: The product can only be used for snow / cloud discrimination during daytime hours, during the night the product only shows the 10.3 µm band for cloud information.

Known issues: Over water bodies, low clouds may appear blue rather than yellowish-green. This issue will be addressed in future versions of the product.
High albedo ground surfaces (e.g., salt flat, White Sands, NM) will appear white like snow.

Cold Valleys and Inversions: Very cold valleys and other cold (< -30 °F) land surfaces may falsely be colored pink like high clouds.

High Terrain: High-altitude surfaces, especially snow-covered in dry air mass environments may confuse the 1.38 µm cirrus mask and appear pink. This issue will be addressed in future versions of the product.

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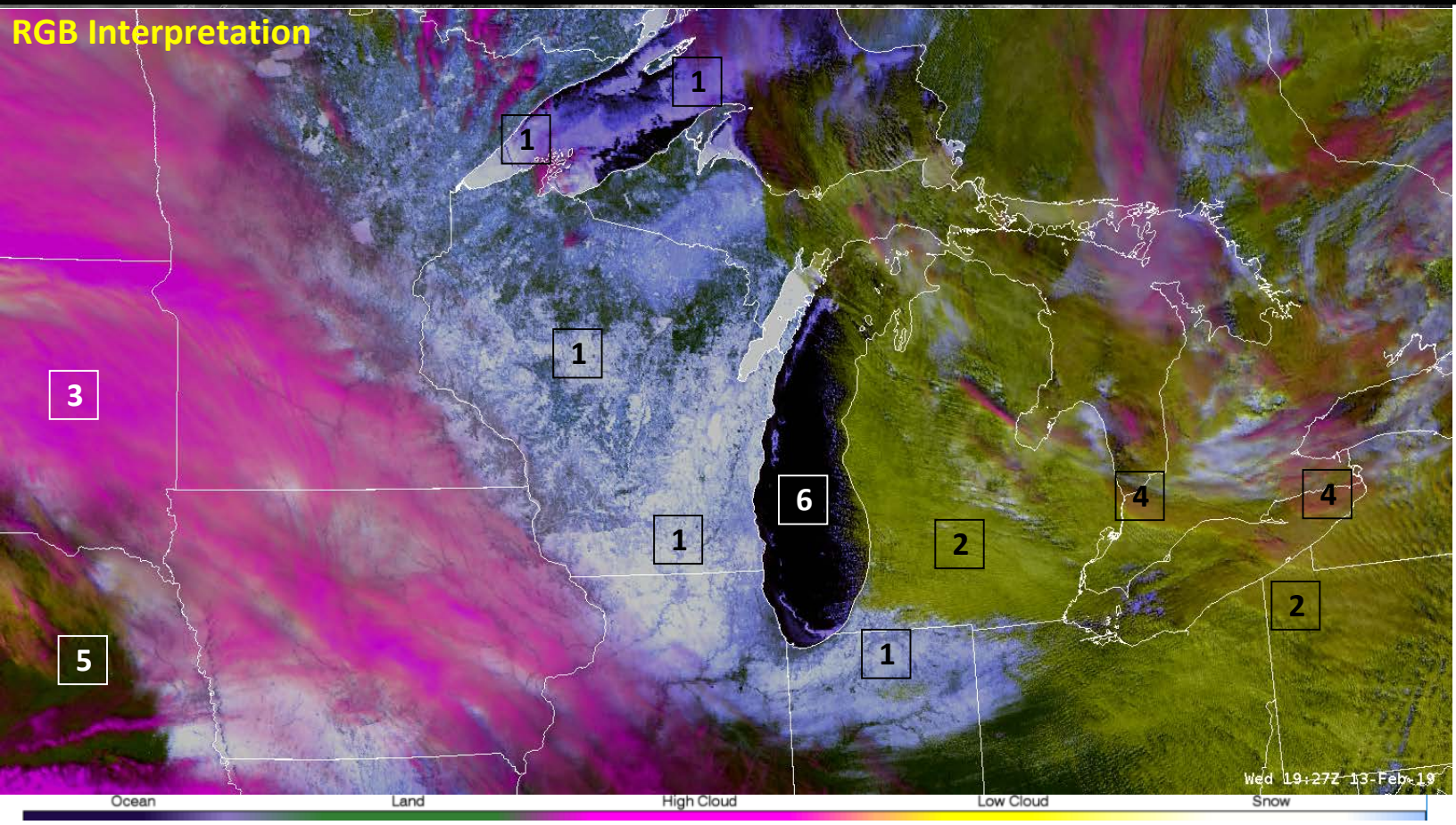
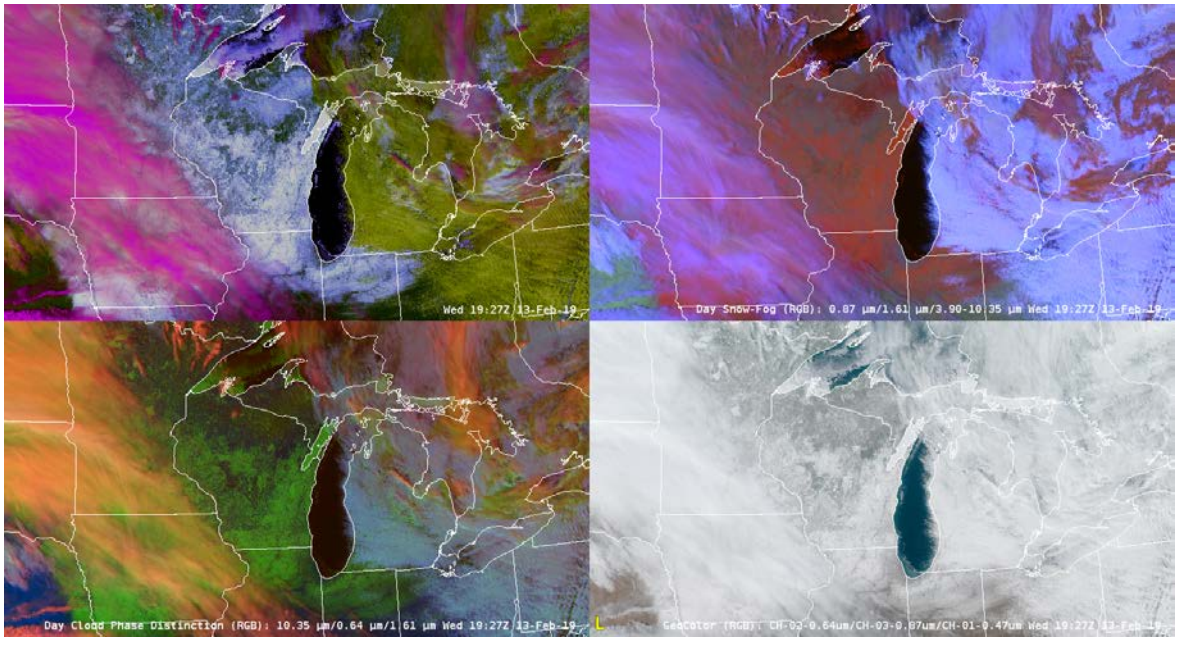
RGB Interpretation



1	**Snow and ice** *(white/bluish white)*	4	**Mid-level cloud/ Thin high cloud over opaque liquid cloud** *(orange)*
2	**Low/liquid cloud** *(yellowish-green)*	5	**Bare ground** *(dark green)*
3	**High/cirrus cloud** *(pink)*	6	**Water** *(Black)*



Comparison of Snow / Cloud Layer (upper-left) with Day Snow RGB (upper right) with Day Cloud Phase Distinction RGB (lower-left) and GeoColor product (lower-right) at 1927 UTC 13 February 2019. The visible imagery that is daytime GeoColor demonstrates how it is hard to discriminate snow cover from clouds. Other RGB products make this discrimination with various colors, however the Snow / Cloud Layer makes snow/ice white.

Resources

RAMMB-Slider