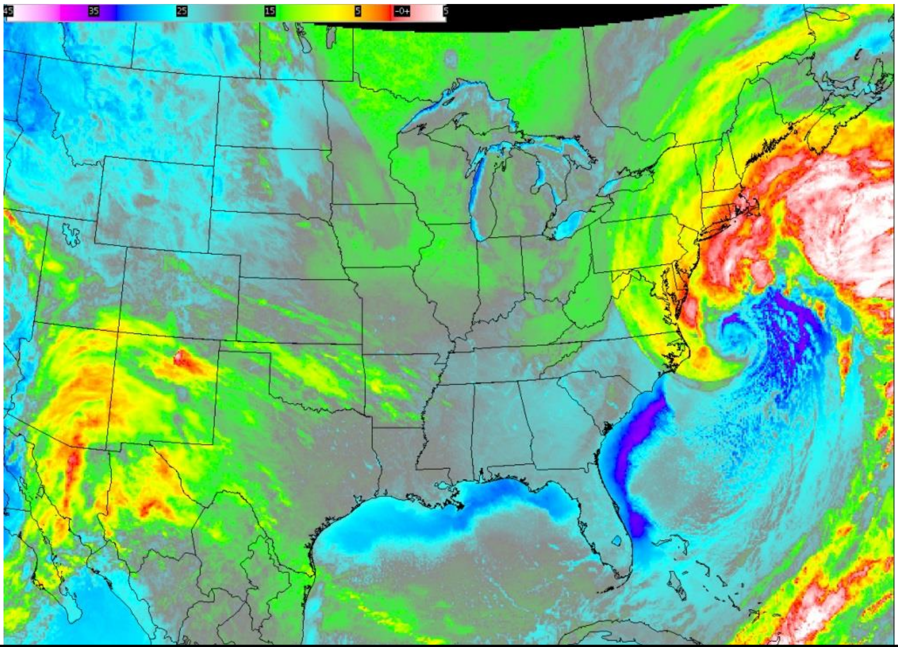
Split Ozone (9.6 µm – 10.3 µm)

Fact Sheet

Why is the "Split Ozone" Brightness Temperature Difference Important?

The Split Ozone Brightness Temperature Difference (BTD, 9.6 µm – 10.3 µm) band can reveal the influence of ozone absorption compared to the clean window. The sign of the BTD is controlled by the temperature of the emitting surface relative to the temperature of ozone in the stratosphere. Very high, cold clouds are typically colder than the stratosphere and the BTD will be positive. Near-surface features are warmer than the stratosphere and the BTD will be negative.



Split Ozone Brightness Temperature Difference, 1022 UTC 4 January 2018

Compare Weighting Functions for the 9.6 µm and 10.3 µm bands on ABI: the 9.6 µm (Ozone) has a peak near/at the surface, and a peak in the stratosphere. The 10.3 µm (Clean Window) has a peak at the surface. Use this information to inform your interpretation of the Brightness Temperature Difference field. A link to the Weighting Function website is in the Resources Box on the next page.

Impact on Operations

<u>Primary Application</u>: The Split Ozone Brightness Temperature Difference (BTD) is the 'green' component of the Airmass Red-Green-Blue (RGB) composite; some features in that RGB can be traced back to this BTD.

Application: Very high clouds have cold emitting temperatures, compared to the warmer temperature of the stratosphere. Thus the BTD over high clouds will be positive.

Application: The BTD will be negative in regions with low (or no) clouds because the stratosphere is much colder than the lower troposphere.

Limitations

Ozone Detection: The Split Ozone Brightness Temperature Difference cannot by itself be used to determine the presence or concentration of ozone in the stratosphere. Ozone retrievals that use multiple ABI bands can do that and are planned for the future.

Near-Surface Ozone: The broad spectral bands of ABI are not sensitive to low-level ozone.

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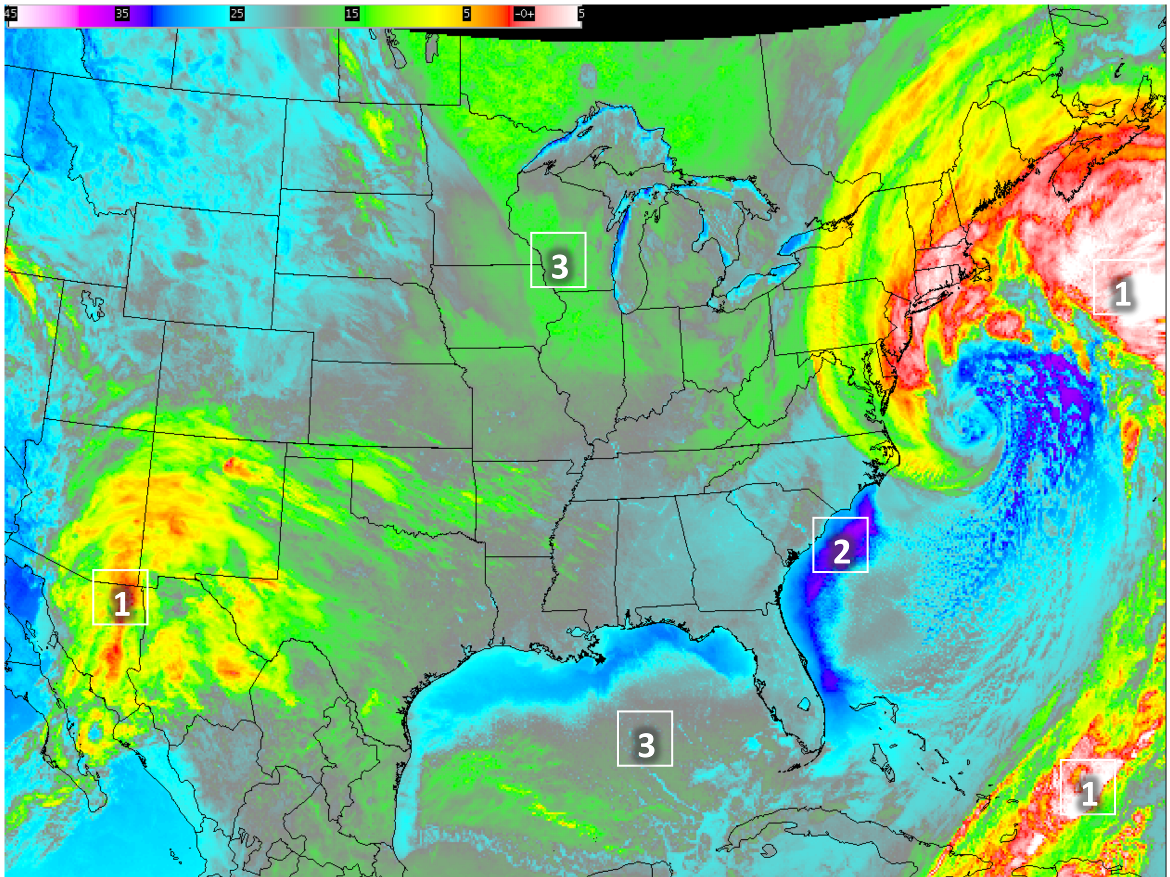
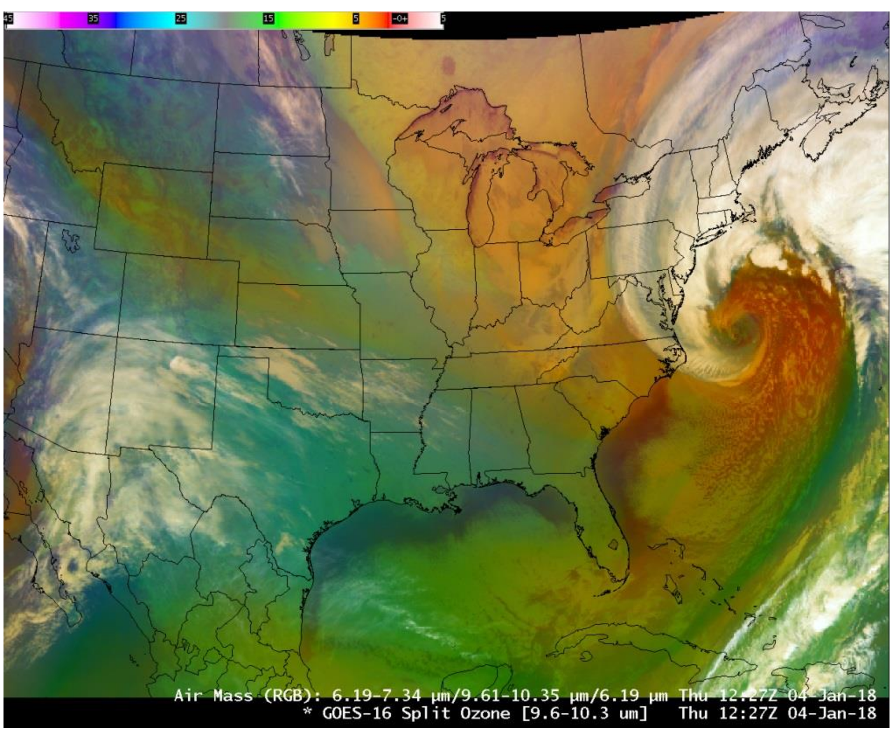
Image Interpretation

1. High Clouds have positive or near-zero values
2. Clear skies over warm water show large negative values
3. Clear skies over land show negative values; low clouds show negative values. The magnitude of the negative value depends on the surface (or cloud) temperature



Split Ozone at 1227 UTC, 4 January 2018



The AirMass RGB at left is constructed using the Split Ozone BTD, above, as the green component. Features in the BTD are apparent in the RGB.

Resources

BAMS Article

Schmit et al.(2017).

OCLO Fact Sheets

Band 12 Fact Sheet

Airmass RGB Reference

Weighting Functions

Hyperlinks do not work in AWIPS but they do work in VLab