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.

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.

Impact on Operations

**Primary Application:** 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:** 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.
High Clouds have positive or near-zero values

Clear skies over warm water show large negative values

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.

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.