

MODIS True Color (RGB) Images

True color images are derived from the Moderate Resolution Imaging Spectroradiometer (MODIS) instrument, which flies onboard NASA's Terra and Aqua satellites.* MODIS has 36 distinct spectral bands, with wavelengths ranging from 0.405 to 14.385 μm . True color images look like photographs, but they are actually created using MODIS's red, green, and blue bands, as shown in Figure 3. Because true color images represent the sum of the red, green, and blue bands, the images are abbreviated as "RGB."

Red	Green	Blue	True Color
Band 1 [620-670 nm]	Band 4 [545-565 nm]	Band 3 [459-479 nm]	

Figure 1. Example of how the red, green, and blue spectral bands of the MODIS instrument are combined to make a true color image of Hurricane Katrina.

Since true color images are generated from visible wavelengths, they reflect what we would see if we were looking down at Earth and the atmosphere from space. As a result, several types of atmospheric and surface features are evident in true color images. Figure 2 shows an example of a true color image for a typical summer day in the United States, which includes clouds, haze, smoke, sunglint, snow, and clear skies.

- **Clouds** are bright white.
- **Haze** and **smoke** often look similar. Both are grey and diffuse or transparent, but haze is usually more transparent than smoke. Smoke is generally a darker grey, and often plumes are visible emanating from a fire. In contrast, haze is typically spread uniformly over a wide area.
- **Sunglint** is an artifact of the MODIS measurement. It is not an atmospheric feature, although sometimes it is mistaken for haze or smoke. Sunglint is caused by the reflection of sunlight off of the surface of water. It appears as a shiny brown or copper color.

- **Snow** is bright white, and can be confused with clouds. Since snow is on the ground, it is broken up by terrestrial features such as rivers, mountains, and valleys, while clouds are not.
- **Clear skies** are any areas where no atmospheric features are blocking observation of the surface. Green forests/crops, brown deserts, and blue oceans/lakes are evident in clear sky areas.

The image generated from the MODIS instrument by a single pass of the Terra or Aqua satellite is called a **swath**. In Figure 2, three swaths are evident. The swath images were taken approximately 90 minutes apart, from east to west, which is why the features do not line up precisely along the swath edges.

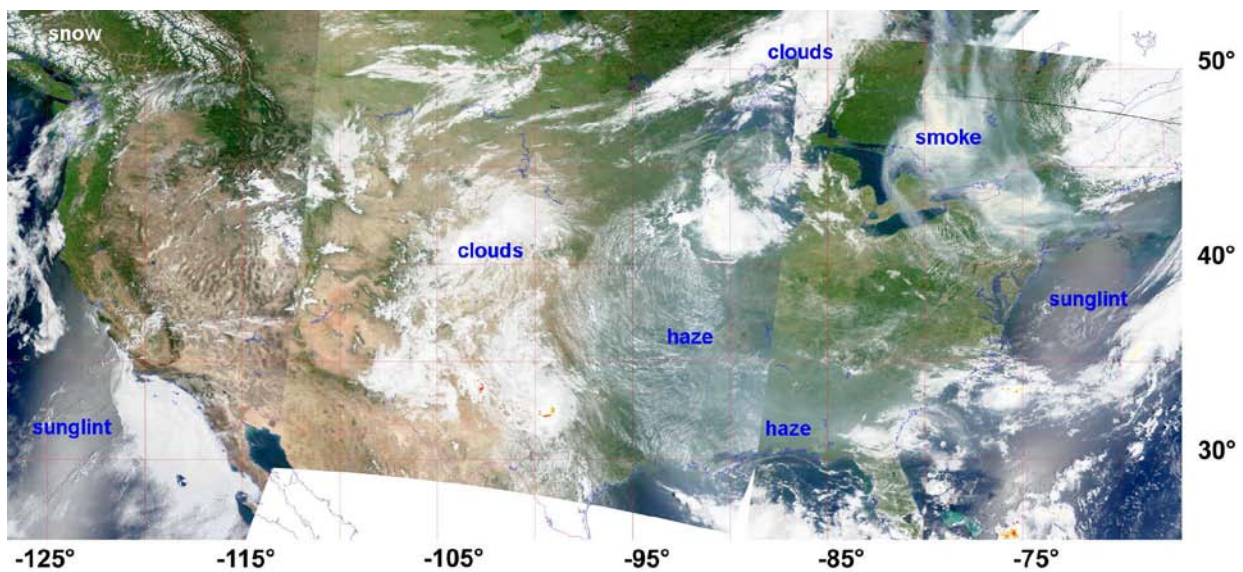


Figure 2. Terra MODIS true color image for July 6, 2002

Note that because true color images are generated from visible wavelengths, they are only available for daylight hours.

*For more information about Terra and Aqua, see the **Satellite Basics Help File**.