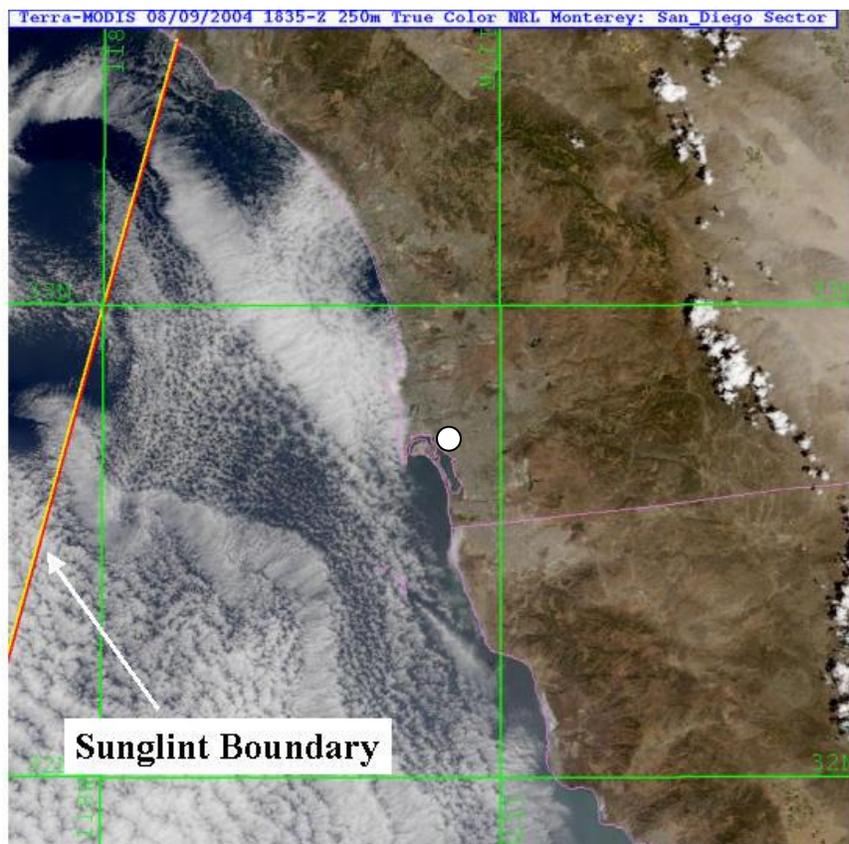




## *Satellite Product Tutorials:* **MODIS "City Zooms"**



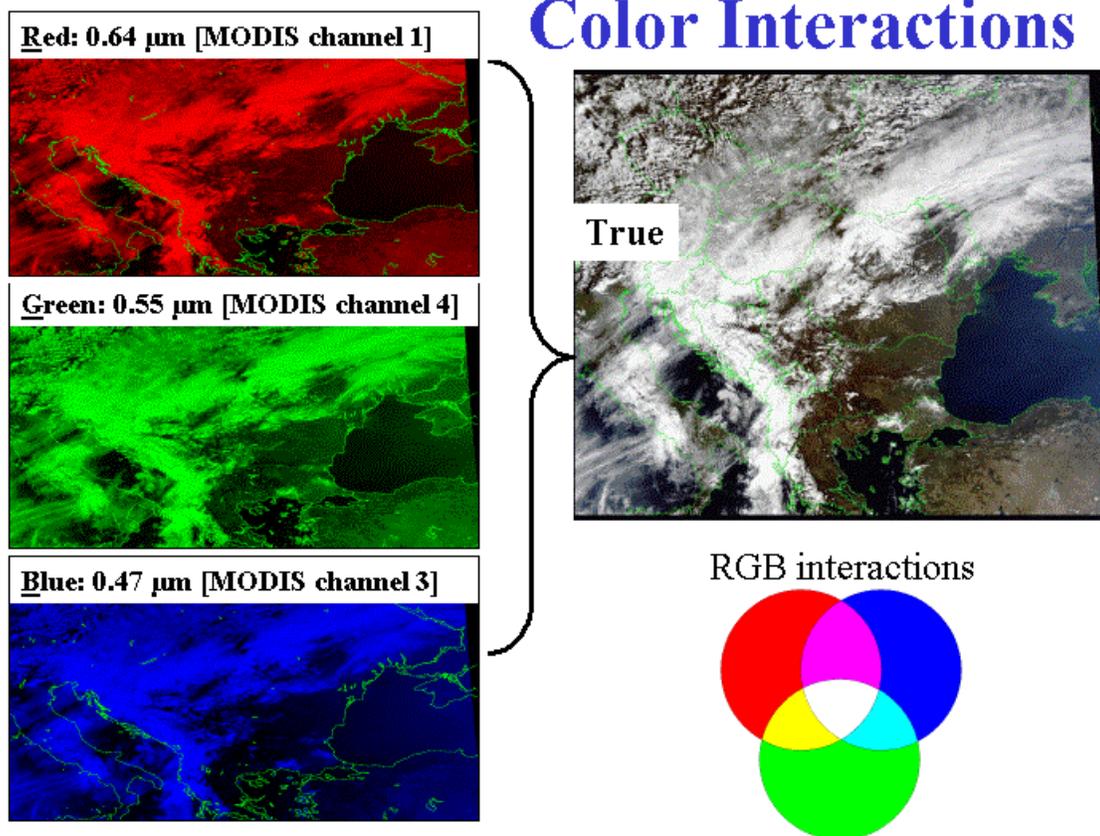
**Above:** The MODIS 250 m true color image depicts the city of San Diego (white dot) and environs surrounding it. Stratus covers much of the Pacific to the west, and orographically forced summertime thunderstorms are already beginning to form over the Laguna mountains in eastern San Diego county. This MODIS true color zoom sees details, like hills, valleys, and urban features that most weather satellite images miss.

## Why We're Interested...

*NexSat's* 250 m resolution city zooms using MODIS tell us about the weather in our communities TODAY, only two or three hours after satellite overpass time. The high spatial detail can help us spot fires, floods, and other unusual weather features. True color strongly resembles what an astronaut would see from the space shuttle looking down from earth: forests are green; clouds are white; urban areas are grey; water is blue. The realism marks a new era in satellite observation of our planet.

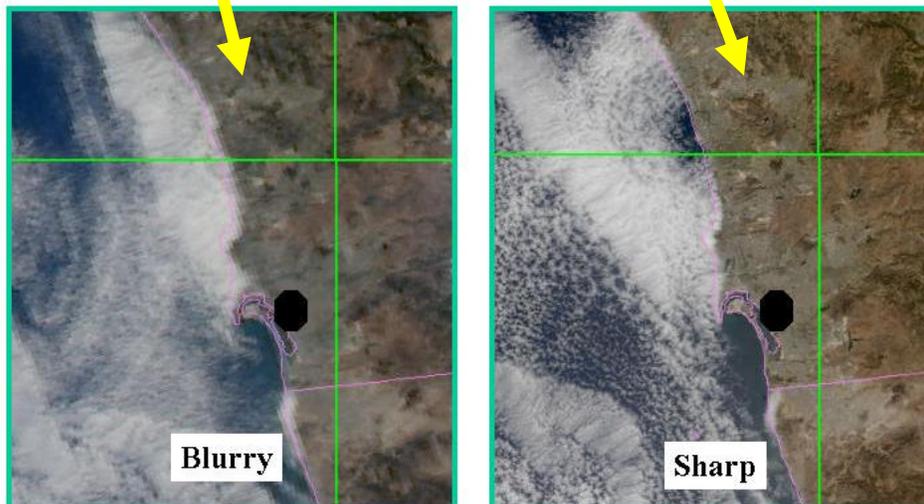
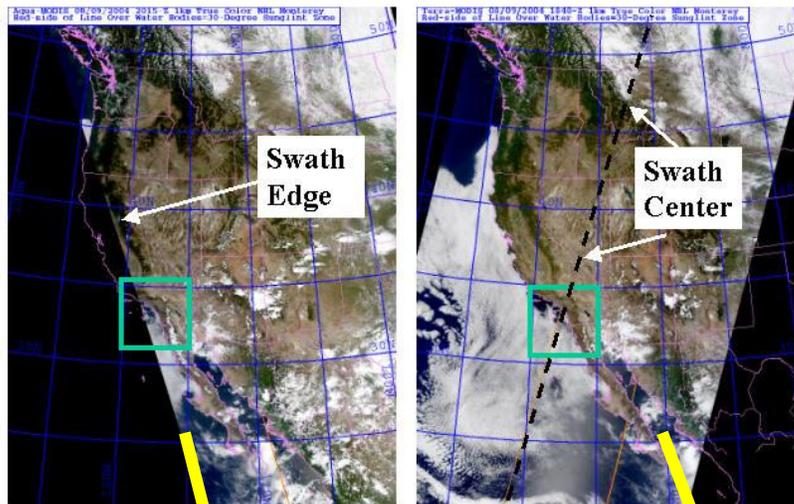
## How This Product is Created...

The illustration below shows that three image channels can be combined to make a true color image. One of the input channels represents the color red, another blue, and another green. You can think of this combination as coming from a red/green/blue (RGB) color projector. The fidelity in true color images allows even the novice to interpret these images correctly.



## How to Interpret...

Expect to see features the way you would see them from a high-altitude aircraft. Vegetation is green; deserts are brown, etc. Water is blue unless a phenomena called sunglint (mirror reflection of the solar disk) turns it a shiny gray. (See the annotated line in the top image of this tutorial.) It's important to realize that views near the center of the MODIS overpass are sharper than those made on the edge of the satellite swath due to the increasing detector footprint projected on the Earth's surface as the MODIS sensor scans away from nadir. In the example below, detail is lost when the image comes from the edge of the of satellite swath, but if the image comes from the swath center, the scene is sharp and clear. This discrepancy will be fixed in the NPOESS era (more below).



## Looking Toward the NPOESS Era...

In the NPOESS era the both the timeliness and quality of true color products will be improved. True color mages from the new Visible/Infrared Imaging Radiometer Suite (VIIRS) will be available in fewer than 30 min from overpass time. At the height of the NPOESS era (three satellites) there will be three true color images per 24 hour period. VIIRS will also be installed on the NPOESS Preparatory Satellite (NPP), a predecessor satellite to NPOESS, scheduled for launch no earlier than 2008. Unlike MODIS (example above), VIIRS images will maintain nearly uniform quality toward the edge. Plus, the VIIRS swath will be wider, providing more coverage.

## Did You Know...?

True color has been available since 1972 from the polar-orbiting Landsat satellite series, but only to researchers after the fact, not to the general public in near-realtime. With MODIS, and especially with NPOESS/NPP VIIRS, all of this is changing!

## Want to Learn More?

Jones, D., 2004a: The Future of Earth—Sensing from Space, The Next Generation Satellite Series: A Look at NPOESS and Its Benefits. *Earth Observation Magazine*, 13, 1, 4-10.

Jones, D., S.R. Schneider, P. Wilczynski, C. Nelson, 2004b: NPOESS Preparatory Project: The Bridge between Research and Operations. *Earth Observation Magazine*, 13, 3, 12-17; 20-22.

Jones, D., C. Nelson, and M. Bonadonna, 2004c: NPOESS: 21st Century Space-Based Military Support, *Earth Observation Magazine*, 13 4, 24-30.

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