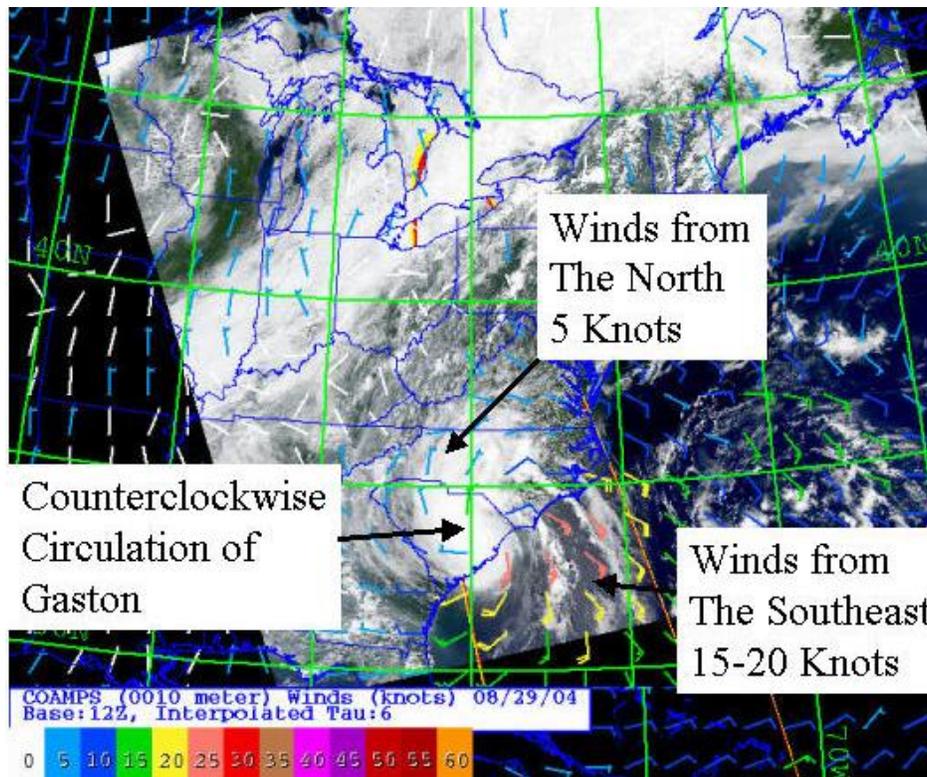


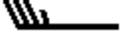


Satellite Product Tutorials:

Forecast Model Overlays



Above: Wind barbs (see table below) are overlaid on top of a MODIS true color image over the east coast of the United States. The cloud swirl over South Carolina is Tropical Storm *Gaston*, which brought heavy rain to the region. The wind barbs are from the 27-km grid resolution Navy Coupled Ocean/Atmospheric Mesoscale Prediction System (COAMPStm). The COAMPStm information is used operationally by the U.S. Navy for short-term weather forecasts for various regions around the world. The flagged part of each symbol points to the direction the wind is coming from. The sharp end of the wind barb points toward the direction that the wind is blowing. The winds have been interpolated to match the time of the satellite observation.

Wind Speeds					
Symbol	Knots	Miles/hr.	Symbol	Knots	Miles/hr.
	Calm	Calm		38-42	44-49
	1-2	1-2		43-47	50-54
	3-7	3-8		48-52	55-60
	8-12	9-14		53-57	61-66
	13-17	15-20		58-62	67-71
	18-22	21-25		63-67	72-77
	23-27	26-31		68-72	78-83
	28-32	32-37		73-77	84-89
	33-37	38-43		103-107	119-123

Graphic Courtesy of NCAR

Why We're Interested...

With overlay of other weather information, the potential usefulness of a satellite image is enhanced. In cover image example above, not only can we see the sea, the land, and the clouds in their natural colors based on satellite information; but with the addition of the winds we can see the circulations of the atmosphere that are causing the cloud features to evolve. The synergistic display of both imagery and winds gives forecasters an added tool in understanding the current state of the atmosphere and how clouds organize under varying dynamics.

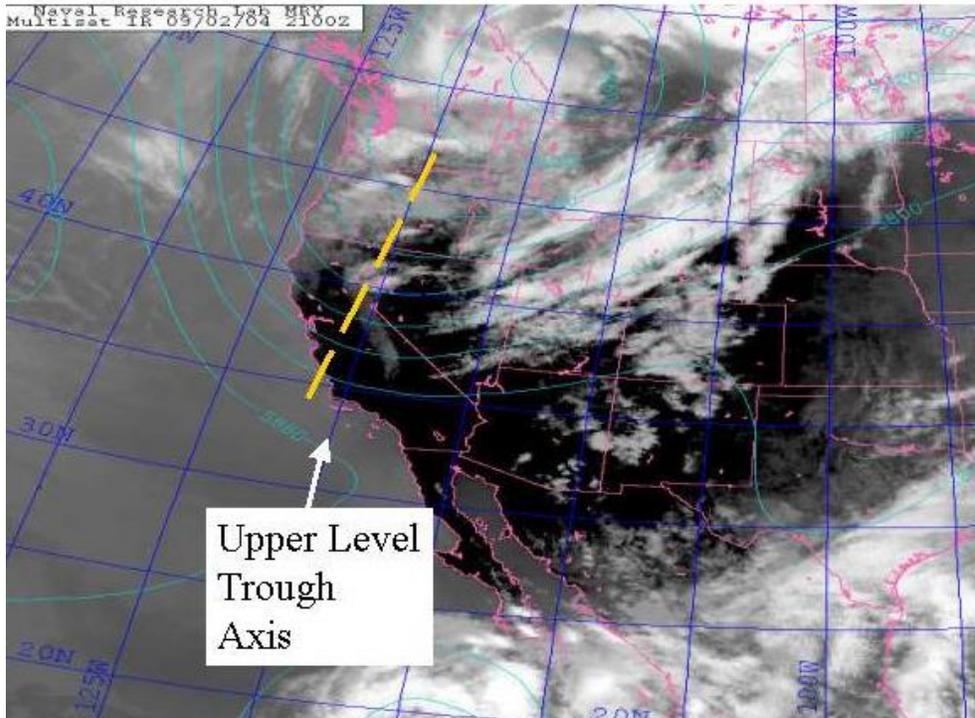
How This Product is Created...

The example image is a true color product from the MODIS Aqua satellite. It represents with realism what human vision would see from space. The overlaid winds from COAMPStm analyses and short-term (up to 12 hr)

forecasts are interpolated (averaged) in time to correspond to the time of the satellite image. Typically, two forecast steps are averaged which are three hours apart. Sometimes this averaging can cause problems in times of rapid winds shifts (e.g., a frontal zone), reducing wind speeds and resulting in inaccurate directions. In general, however, these caveats are minimal and the interpolated wind fields match well with satellite-observations (e.g., cloud "streets" aligned with the low-level flow). The winds shown apply to conditions at the surface of the earth. The NexSat satellite application also shows winds for the 300 mb level, or about 30,000 feet. This upper level winds can reveal jet streams that are traced by high clouds, often called jet stream cirrus. Also shown are overlays of 500 mb pressure heights on images (example image below). The 500 mb level is notable because about half of mass of the atmosphere lies above it, and half below.

How to Interpret...

The barbs are color-coded. So if you don't want to look at the barbs themselves to determine the wind speeds (see chart above) you can match their color with the color bar provided at the bottom of the image. Be cautious because the winds apply only to one level of the atmosphere. For example, in the true color overlay above, the winds are valid for the surface of the earth where we live. On the other hand, cloud features exist at a variety of levels. So, some clouds might move in a different direction than indicated by the surface winds.



500 Mb Pressure Level Overlay on an Infrared Image

Looking Toward the NPOESS Era...

To operational users, old satellite images—even as old as a few hours—are like yesterday's newspapers. Their value declines rapidly. Fortunately, the NPOESS system to be launched near the end of this decade will have a sophisticated relay system to bring satellite products to users—even people located on the other side of the world--within 30 minutes of satellite overpass time. The NPOESS imager is called the Visible/Infrared Imager/Radiometer Suite (VIIRS).

Did You Know...?

...that the first weather satellite was launched by the United States in April 1960? Meteorologists were surprised by the first images, which showed that clouds banded in unusual ways. It is a very different perspective from what observers had seen from the ground for thousands of years!

Want to Learn More?

Satellite Modules from COMET:

[COMET Modules on Satellite Interpretation](#)

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