NAVY/NRL Tropical Cyclone Passive Microwave Data

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Introduction

The Navy/NRL Tropical Cyclone Page is a site that presents several types of passive microwave images. All the images in this presentation come from the NAVY/NRL Tropical Cyclone Page.

Types of Data

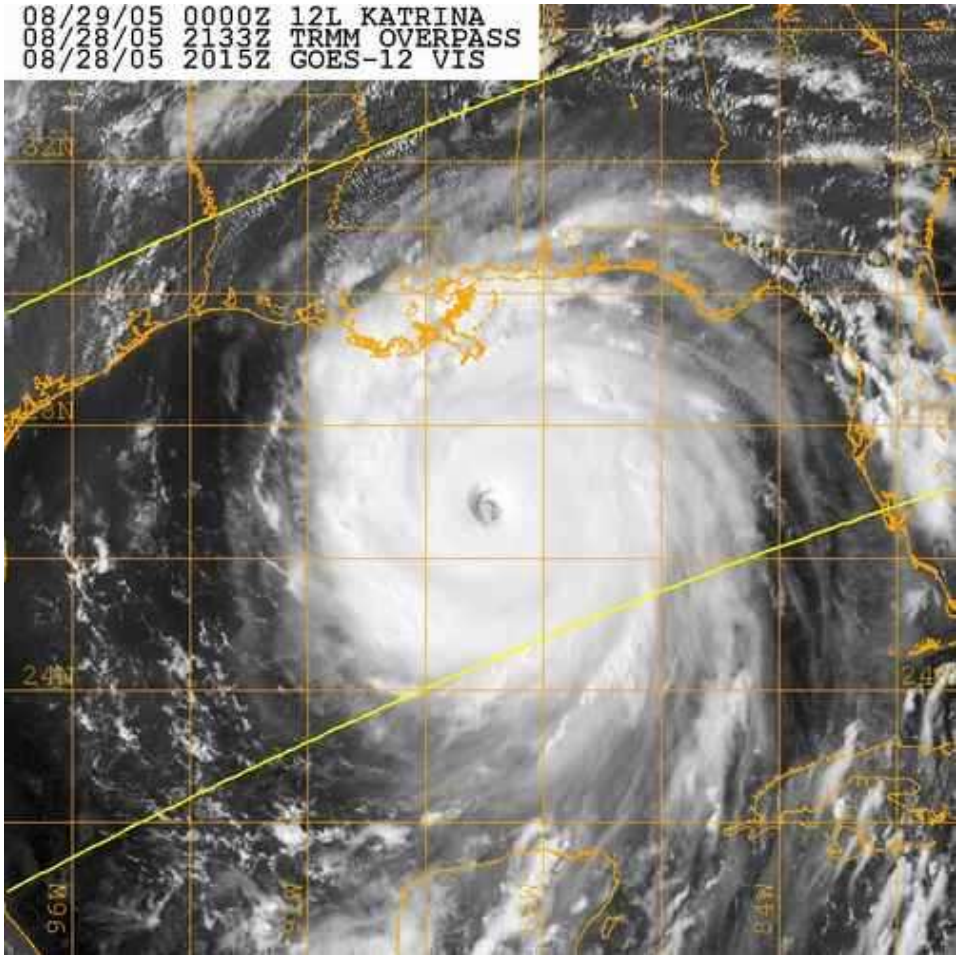
There are 14 unique kinds of data available:

Visible	Infrared
Infrared with BD curve	Multi-Sensor
85 GHz Horizontal Polarization	85 GHz Weak Polarization
85 GHz PCT	85 GHz Color Composite
Rainrate	Wind Speed
37 GHz Color Composite	37 GHz Vertical Polarization
37 GHz Horizontal Polarization	SSM/I Vapor

The data is received from 10 main sensors and satellites, including the TMI and SSM/I sensors.

Visible

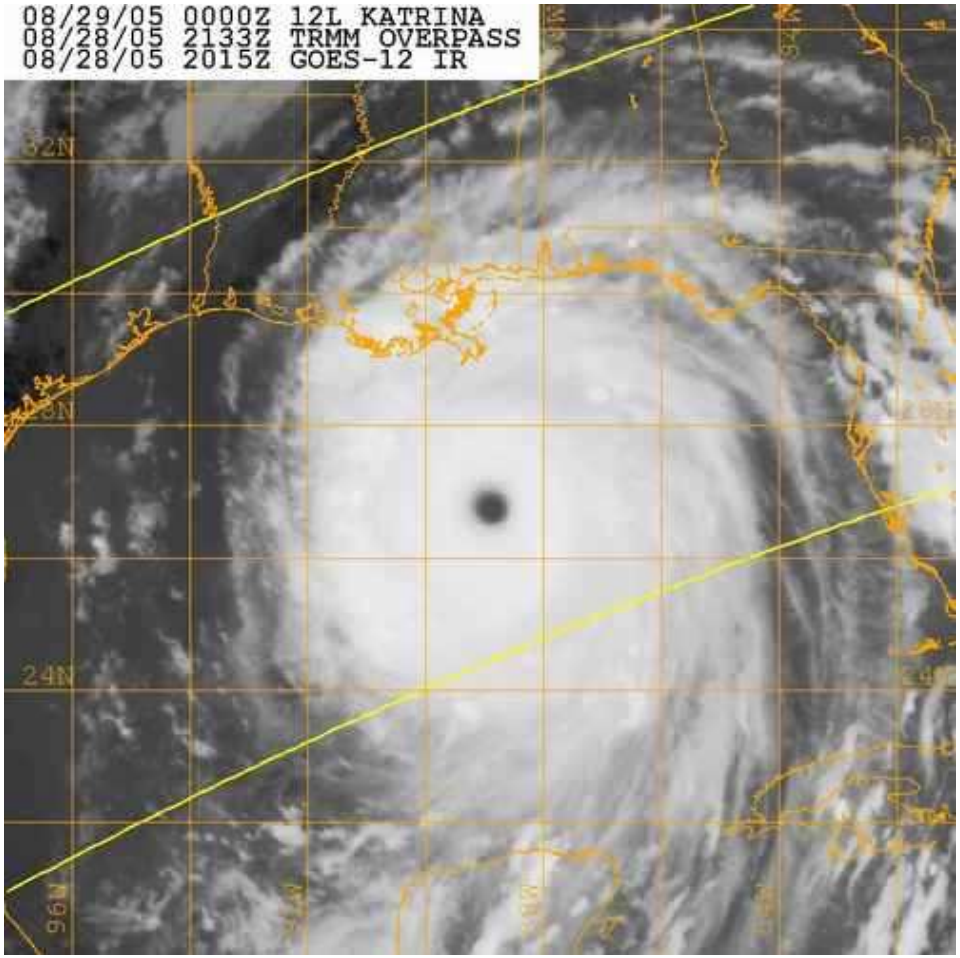
This type of data is simply a black and white image of the cyclone.



Visible image of Hurricane Katrina from the TMI sensor.

Infrared

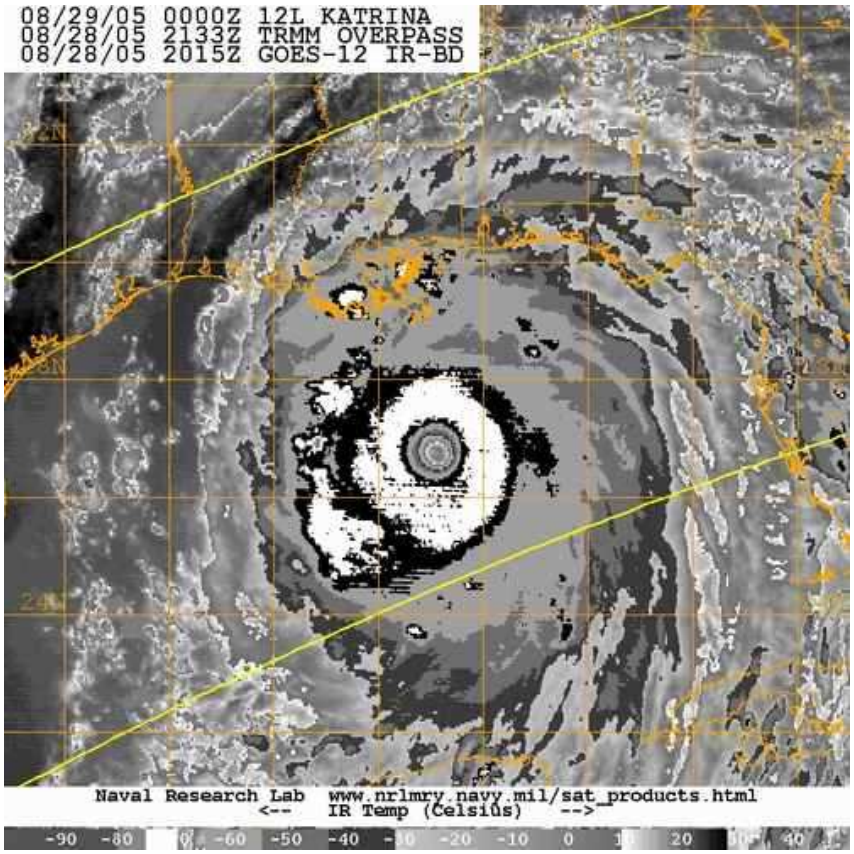
Infrared imaging gives the ability to see cloud structures that cannot be seen in visible light. Infrared is usually shown in black and white, with the exception of the images produced by GEO and MODIS.



Infrared image of Hurricane Katrina from the TMI sensor.

Infrared with BD Curve

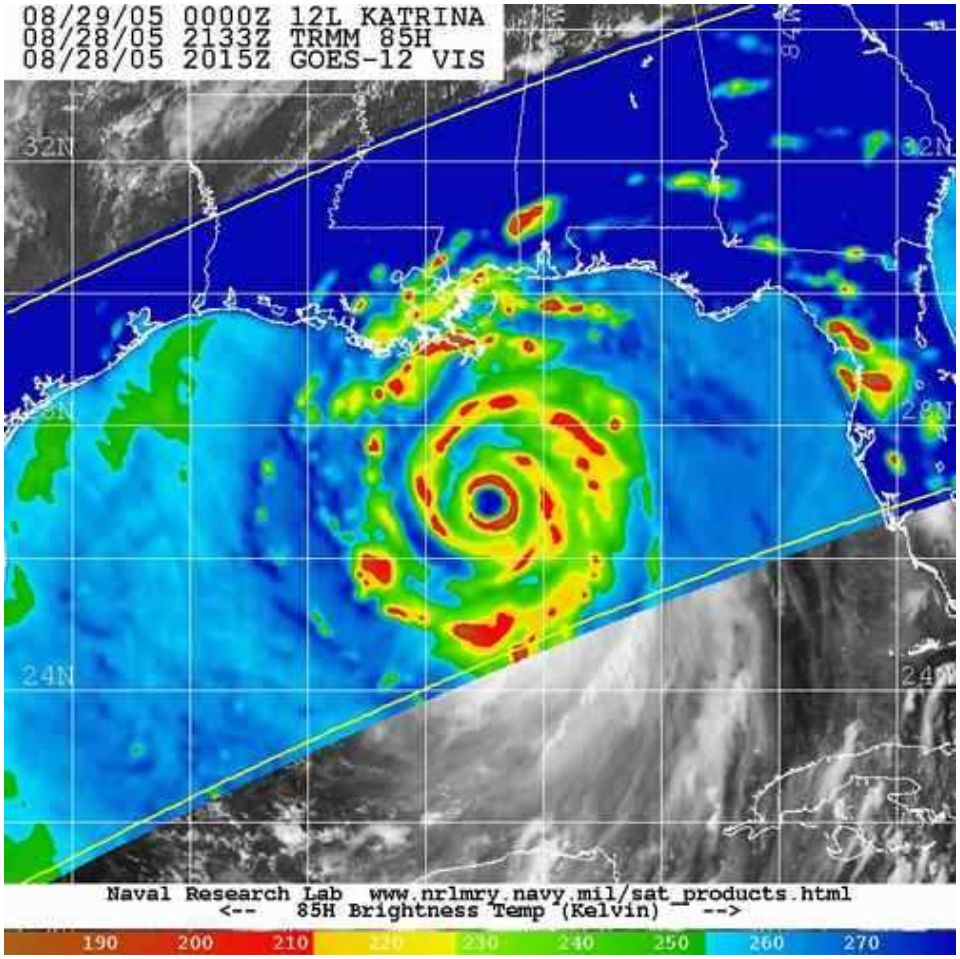
The infrared image on the next slide shows an infrared image enhanced with the BD curve. This is also known as Dvorak enhancement. The BD curve highlights cloudtop temperatures.



BD enhanced infrared image of Hurricane Katrina taken by the TMI sensor.

85 GHz Horizontal Polarization

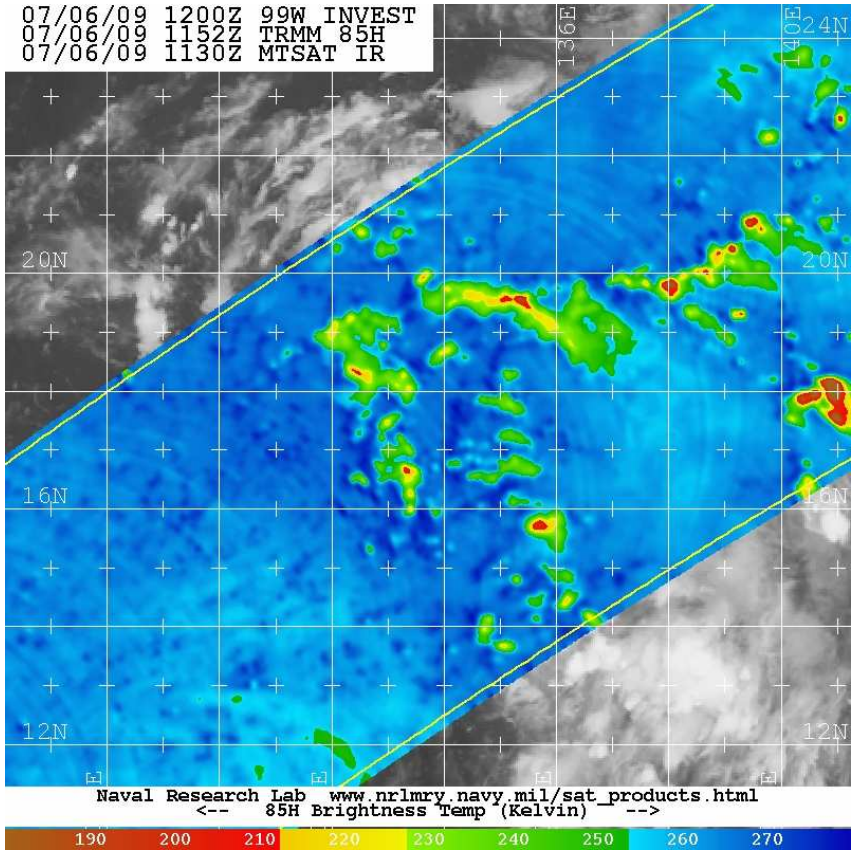
The 85 GHz H image depicts areas of convection based on brightness temperatures. Low brightness temperatures indicate convection.

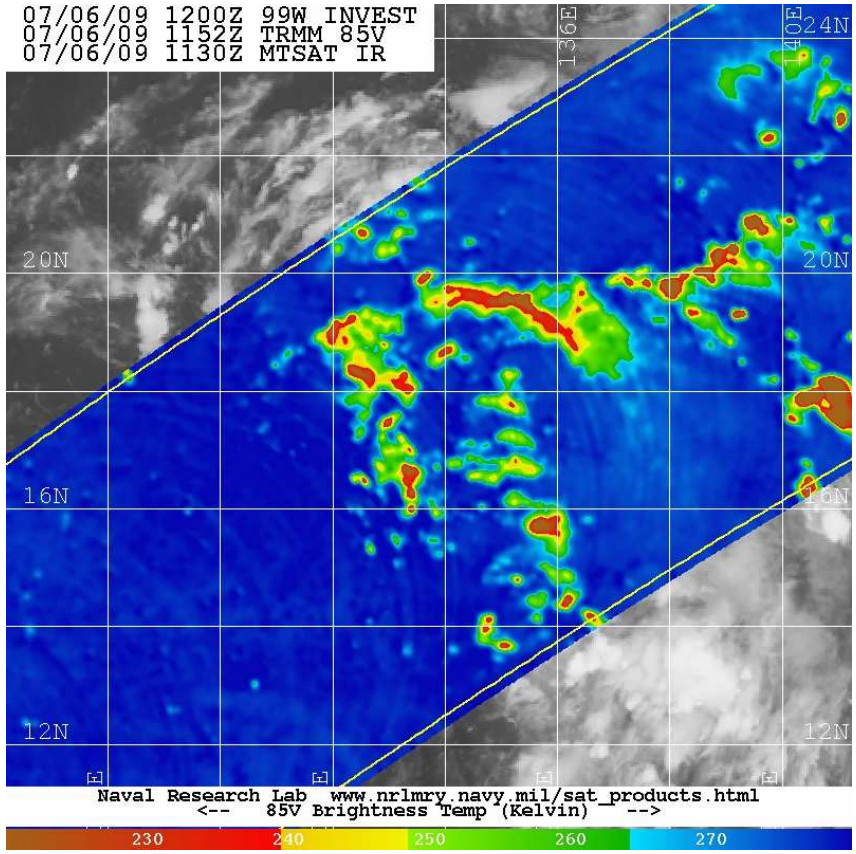


85 GHz H image of Hurricane Katrina from the TMI satellite.

85 GHz Weak Polarization

The weak version of the 85 GHz channel creates images with a minimum brightness temperature of around 220 K. This modified range allows weak convection to be more clearly defined.

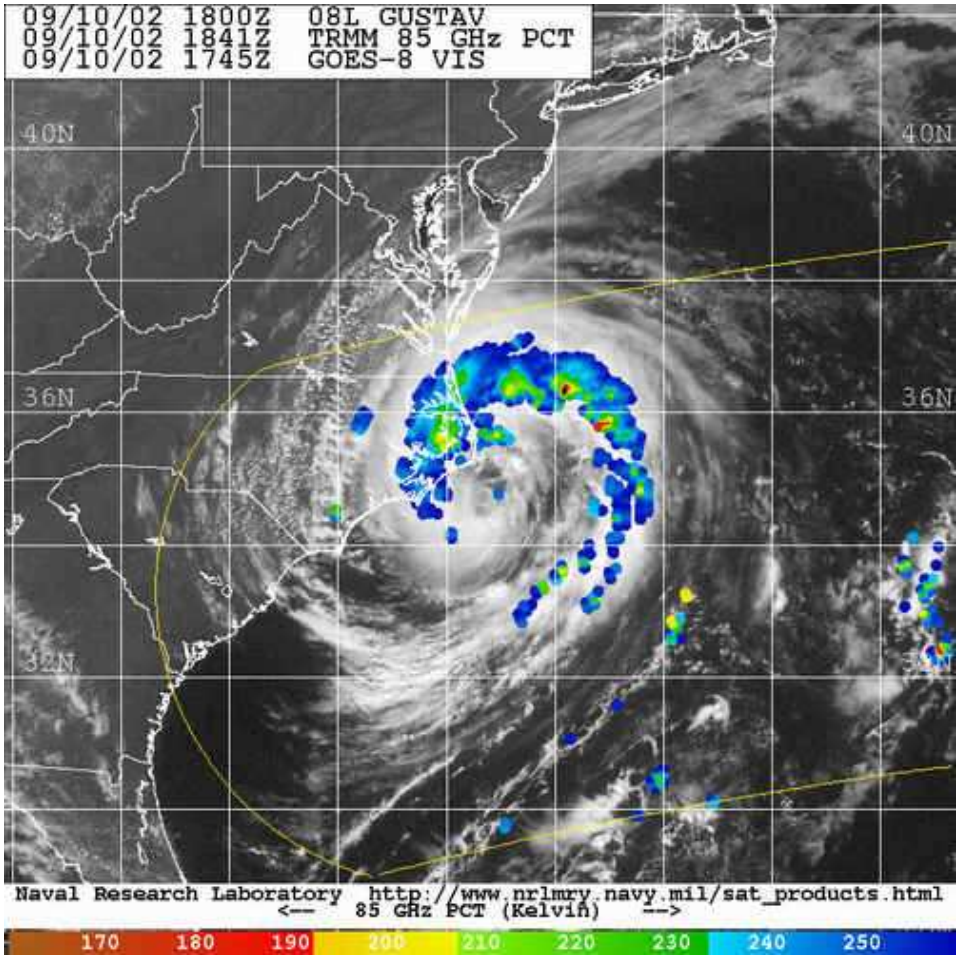




85 GHz H (left) image and 85 GHz weak (right) image of 99W Invest taken by the TMI sensor.

85 GHz Polarization Correction Temperature

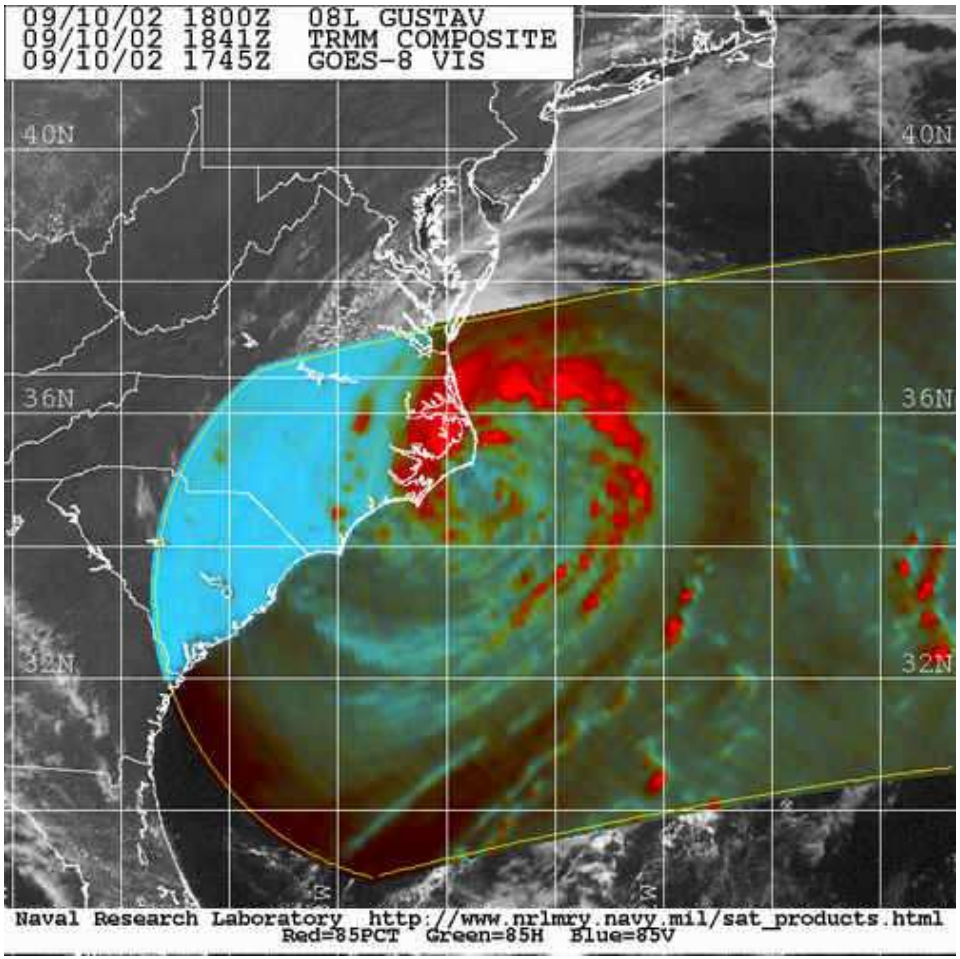
The 85 GHz PCT channel combines 85 GHz channels and eliminates any low level clouds, water vapor, or ocean values.



85 GHz PCT image of Hurricane Gustav from the TMI sensor.

85 GHz Color Composite

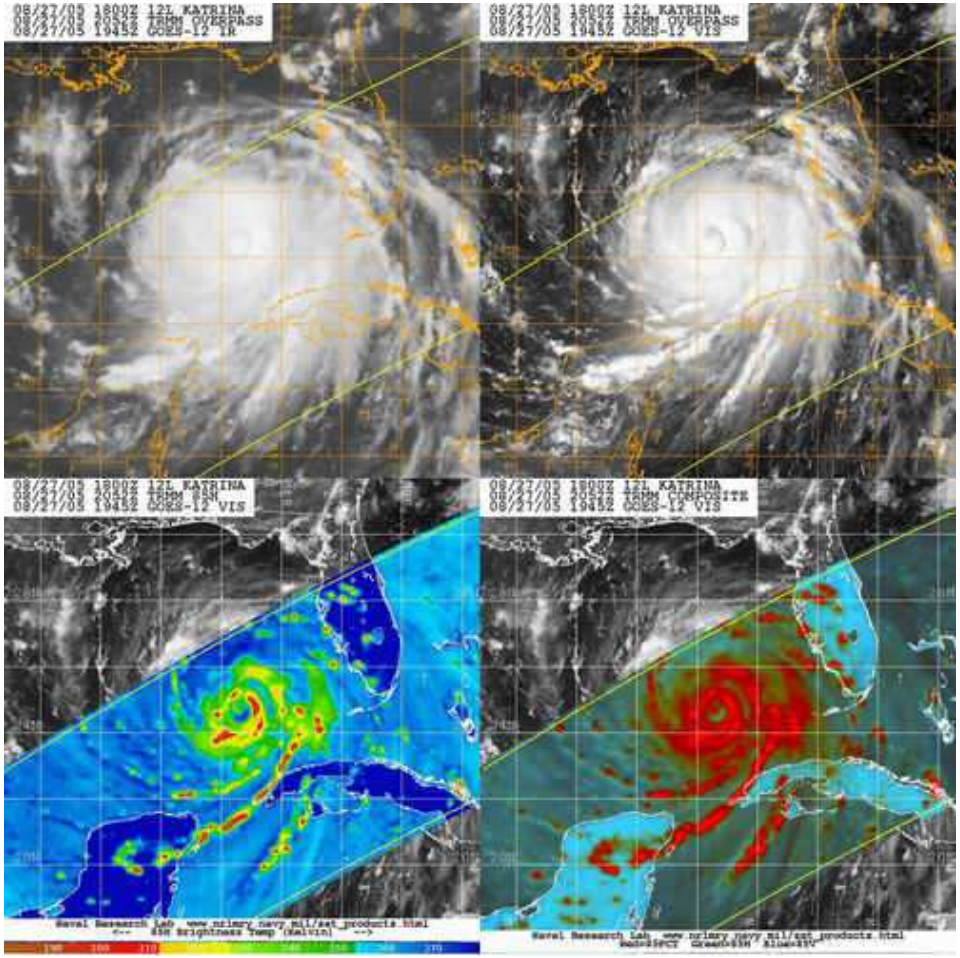
The 85 GHz color composite channel combines the 85 GHz channels and the PCT channel to create an image.



An 85 GHz color composite image of Hurricane Gustav taken by the TMI sensor.

Multi-Sensor Data

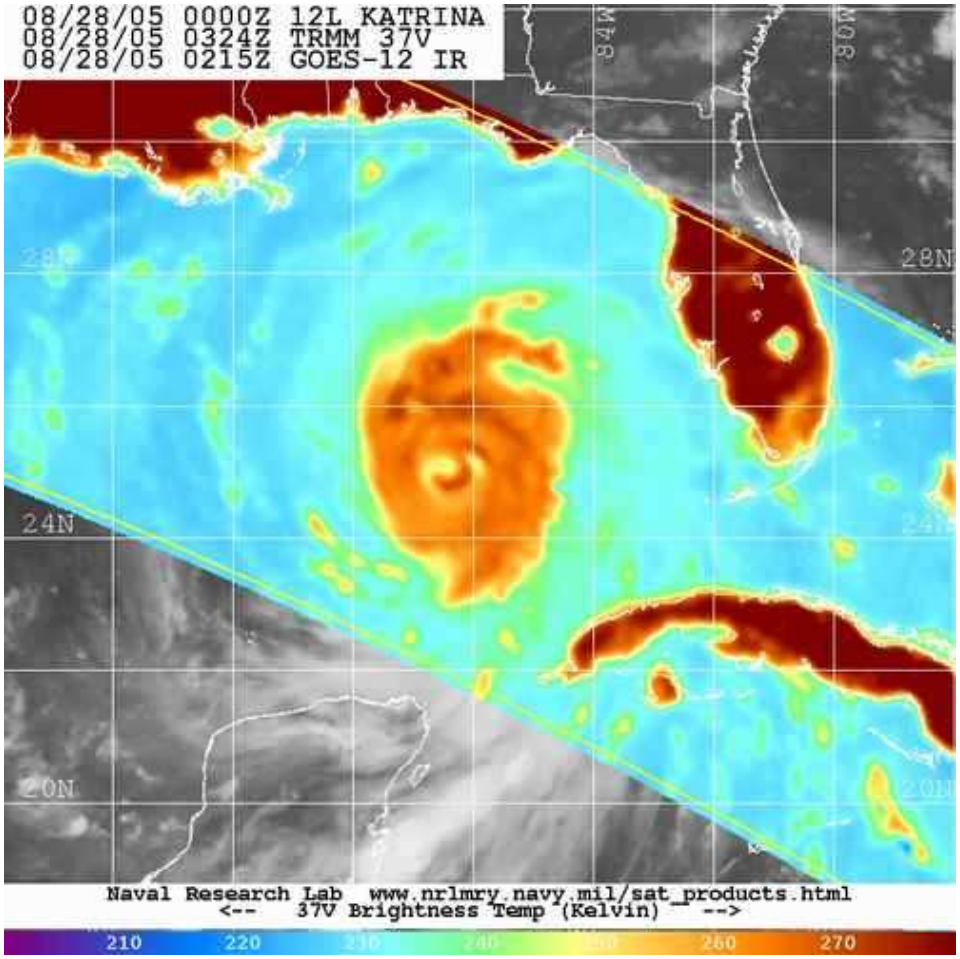
The multi-sensor image is a composite of four different types of images: visible in the upper right corner, infrared in the upper left corner, 85 GHz color composite in the lower right corner, and 85 GHz PCT in the lower left corner. The visible image is replaced with an IR-BD image at night.



Composite image of Hurricane Katrina from the TMI sensor.

37 GHz Vertical Polarization

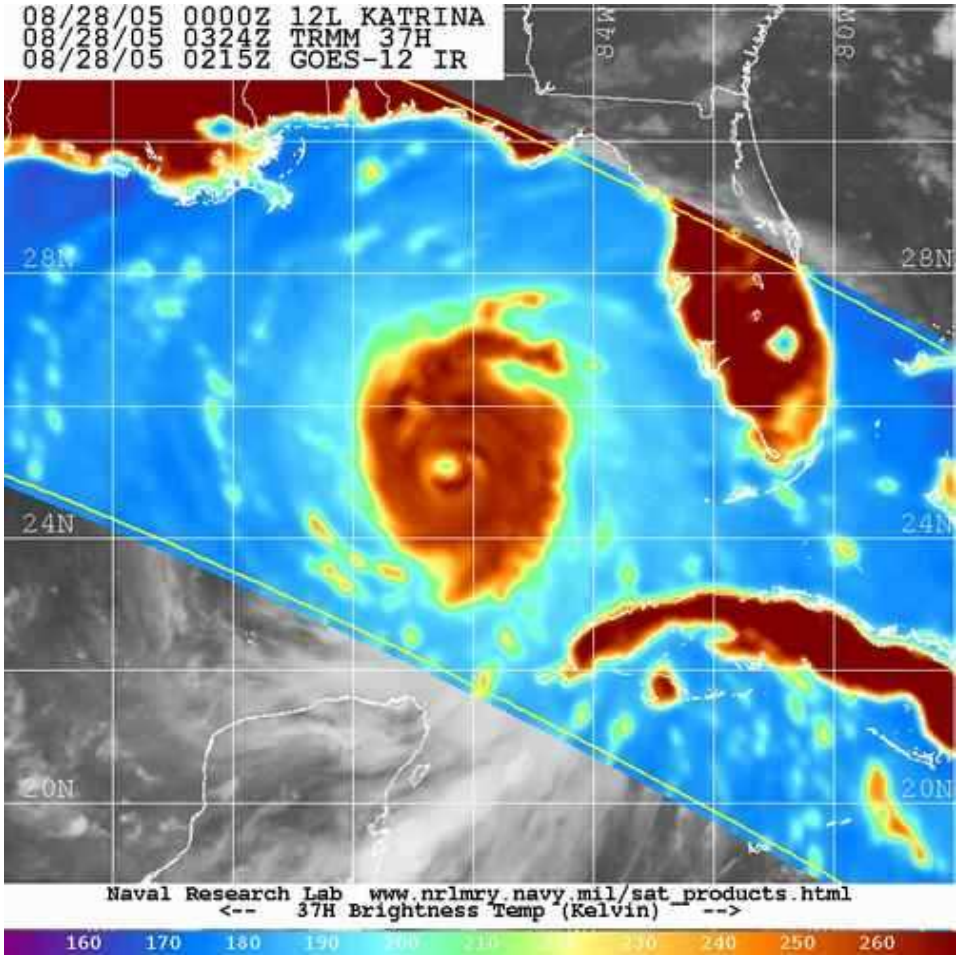
The 37 GHz channel is sensitive to rainbands. Higher brightness temperatures indicate greater amounts of rain.



A 37 GHz image of Hurricane Katrina from the TMI sensor.

37 GHz Horizontal Polarization

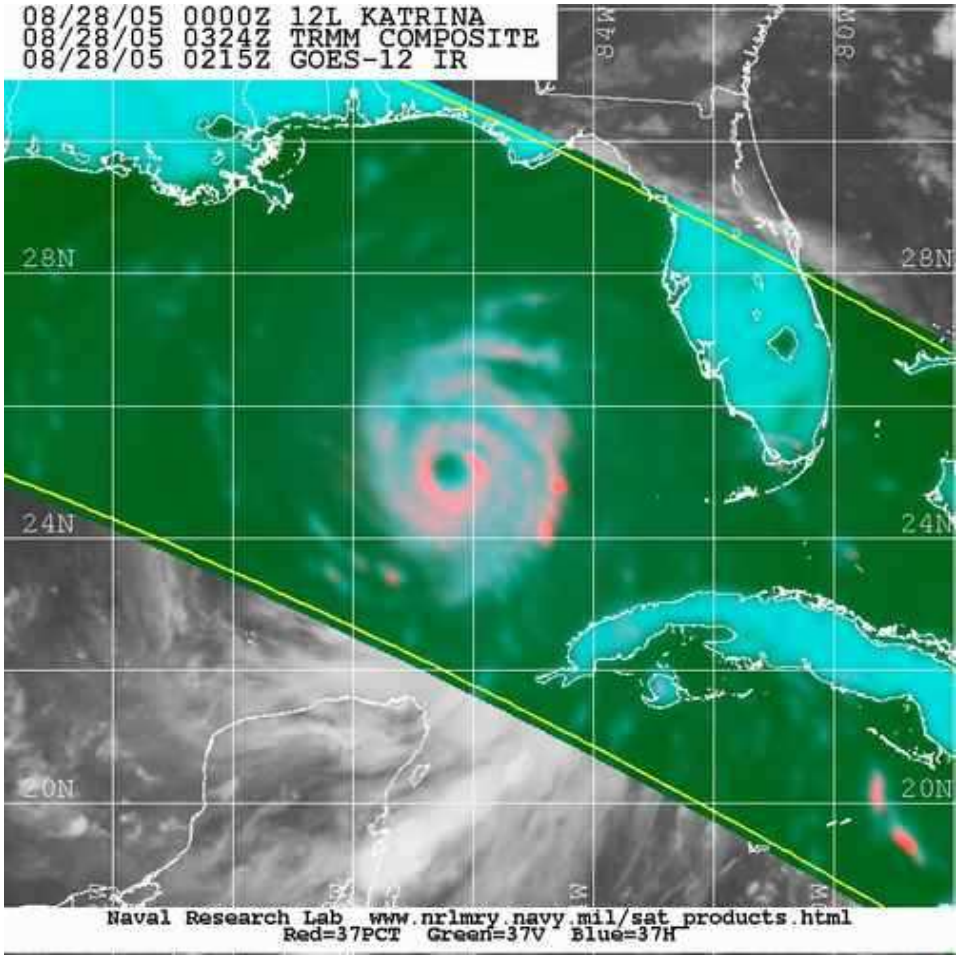
This channel provides the same type of image as the 37 GHz V channel with greater contrast and detail.



A 35 GHz horizontal image of Hurricane Katrina taken by the TMI sensor.

37 GHz Color Composite

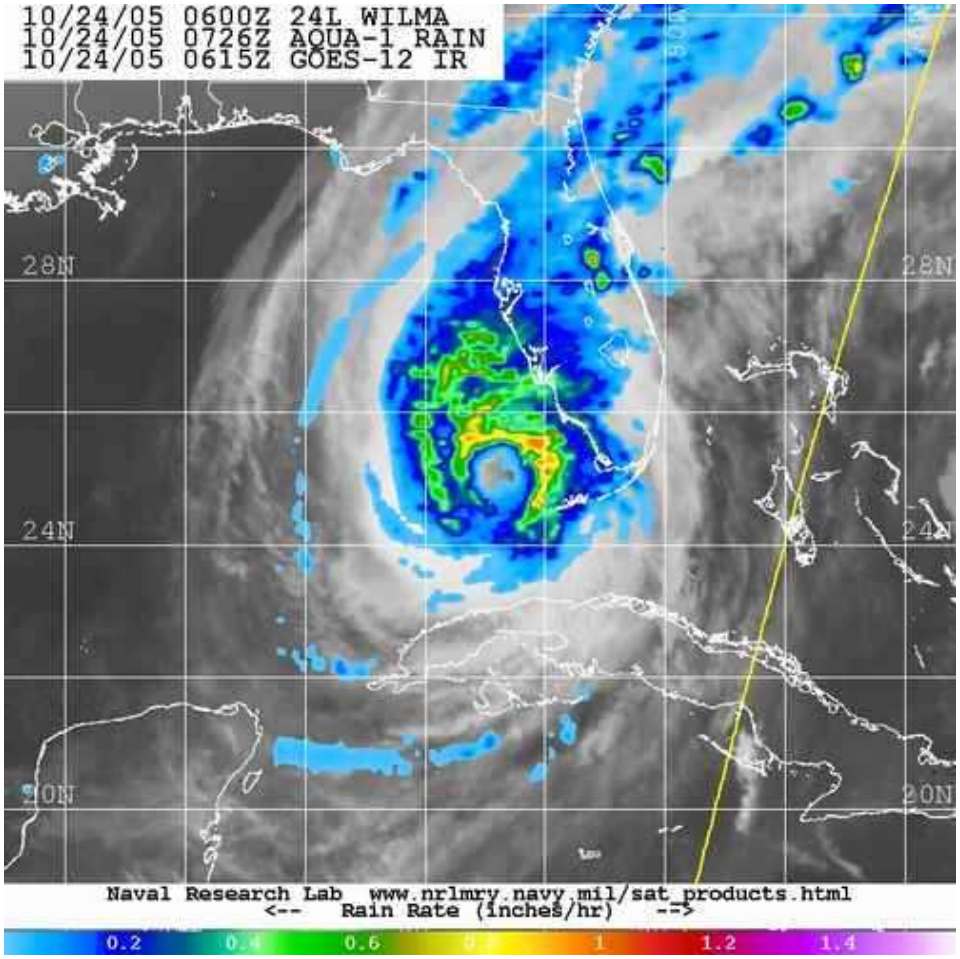
This image is a PCT composite of the 37 GHz channels.



A 37 GHz color image of Hurricane Katrina from the TMI sensor.

Rainrate

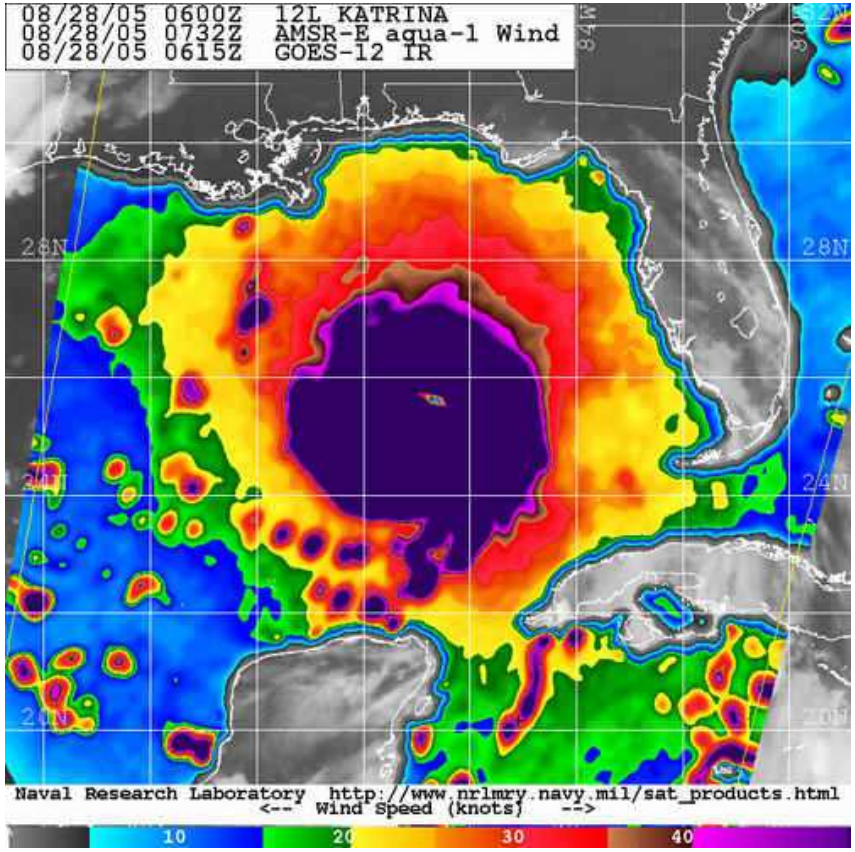
This type of image depicts the rate of rainfall in inches per hour.

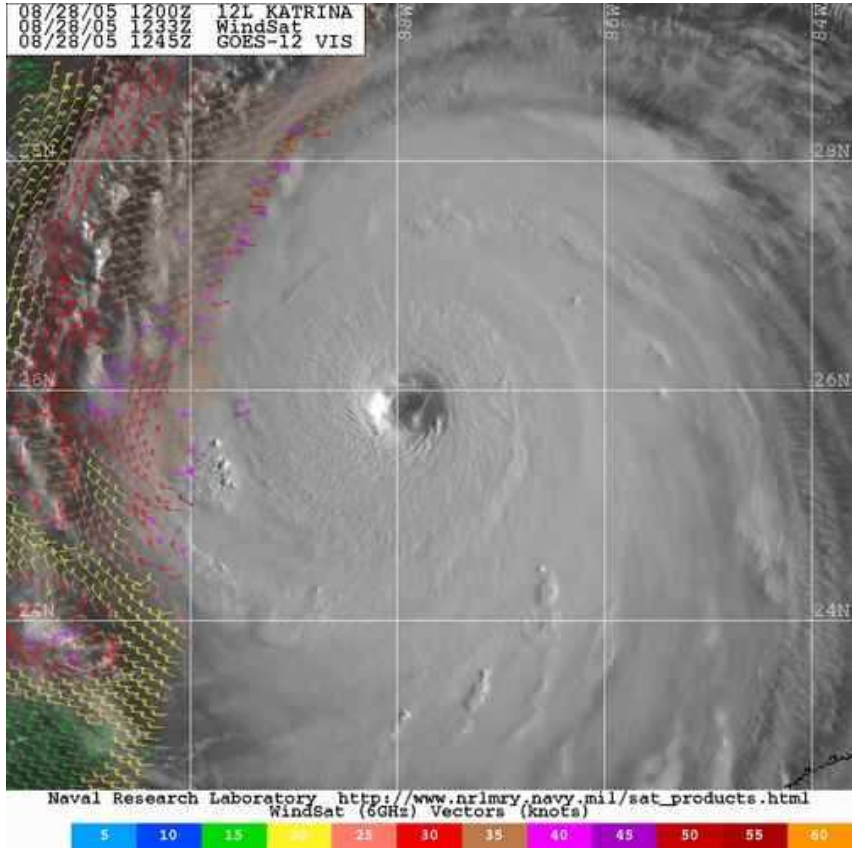


Rainrate image of Hurricane Wilma from the AMSR-E sensor.

Wind Speed

The wind speed images show varying wind speeds in knots.

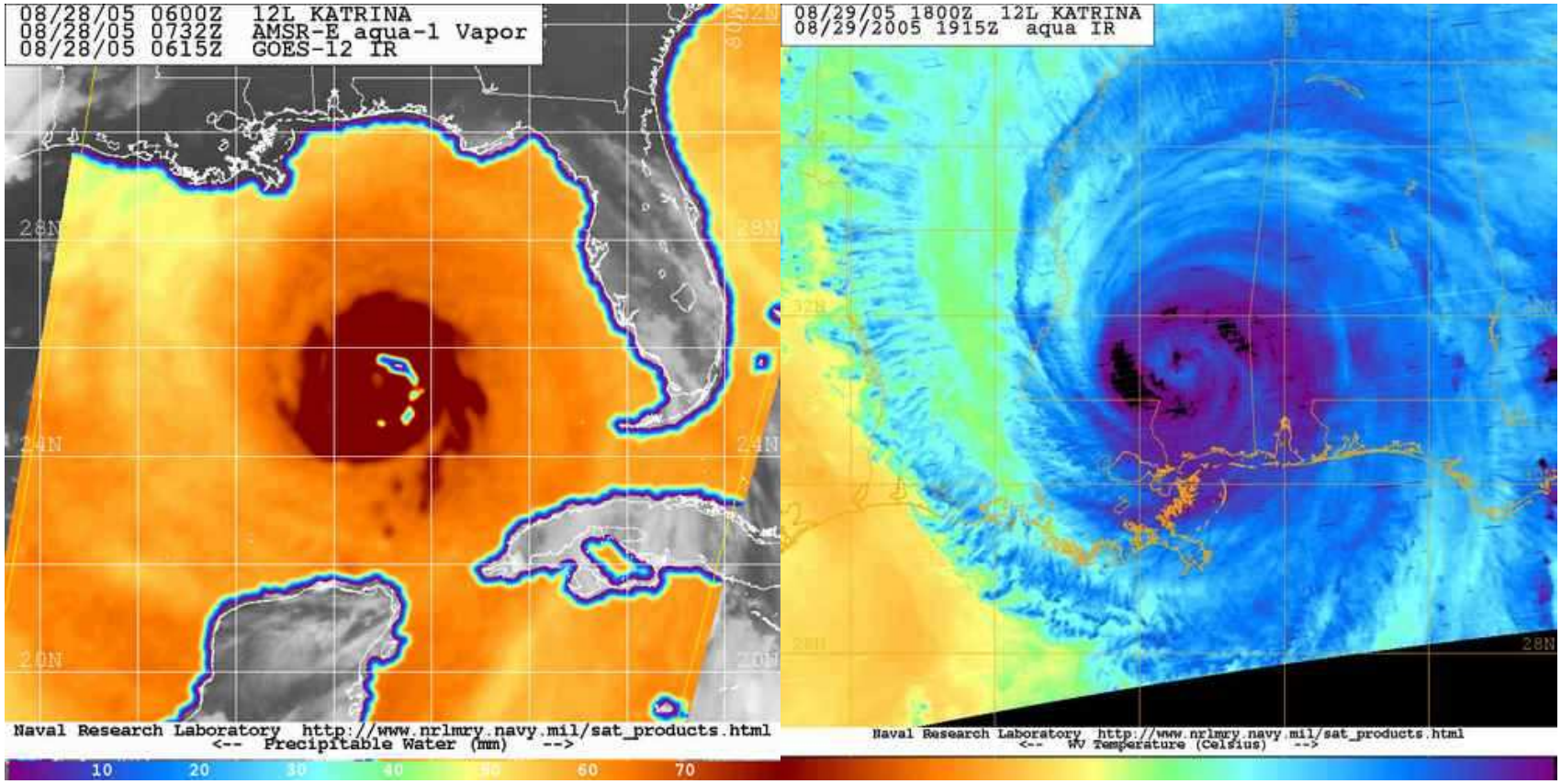




Wind speed images of Hurricane Katrina from the AMSR-E sensor (left) and the WINDSAT sensor (right).

Water Vapor

The water vapor image shows the amount of water vapor in the atmosphere in mm. The images provided by the GEO and MODIS satellites show water vapor temperature rather than amount.



Vapor amount taken by the AMSR-E sensor (left) and vapor temperature taken by GEO (right) of Hurricane Katrina.

Questions?