

Contribution of Satellite Microwave Data to Hurricane Research and Operations

Kyle Hilburn, Chelle Gentemann, Deborah Smith, Frank Wentz
Remote Sensing Systems, Santa Rosa, CA

DISCOVER
www.discover-earth.org

Remote Sensing Systems
www.remss.com



Microwave Optimally Interpolated Sea Surface Temperatures

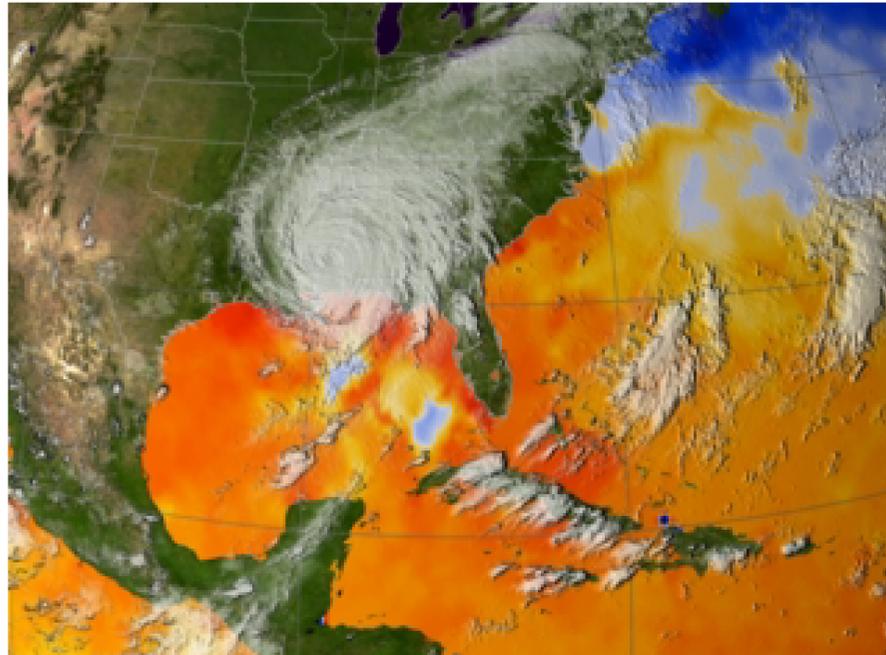
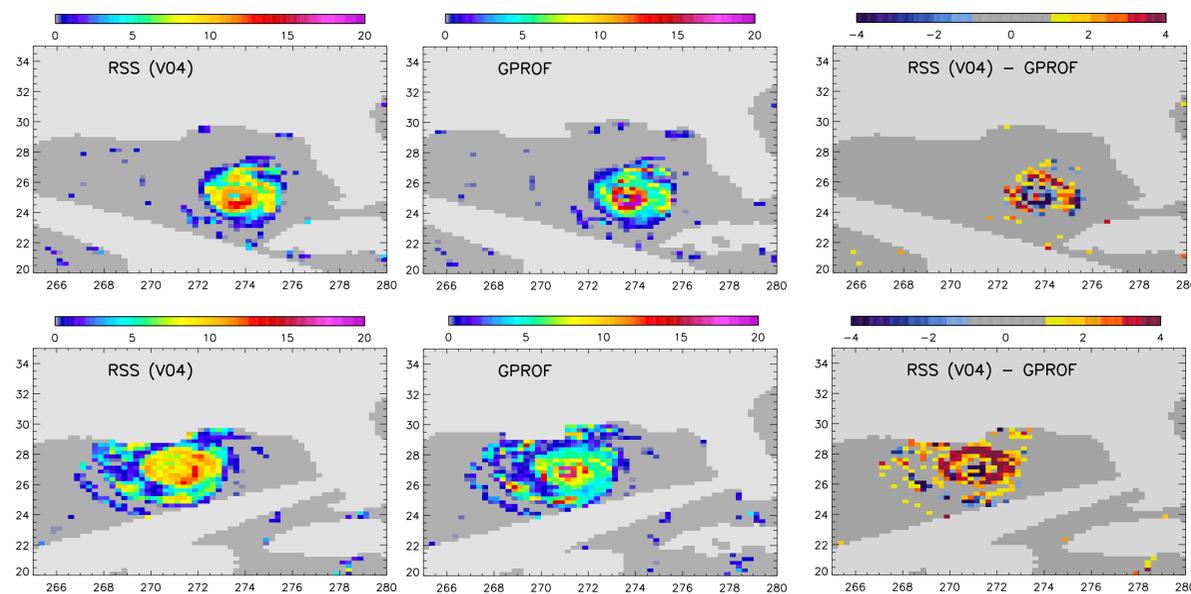


Image credit: NASA/Goddard Space Flight Center Scientific Visualization Studio.

As seen in the movie "An Inconvenient Truth" starring Al Gore.

SSTs available through: www.discover-earth.org. They are 0.25-degree, daily, optimally interpolated SSTs using data from TMI and AMSR-E. They have an accuracy of 0.65 deg C globally. They are microwave, so they can see through clouds; and they represent a pre-dawn, daily minimum "foundation" temperature.

New Rain Rates

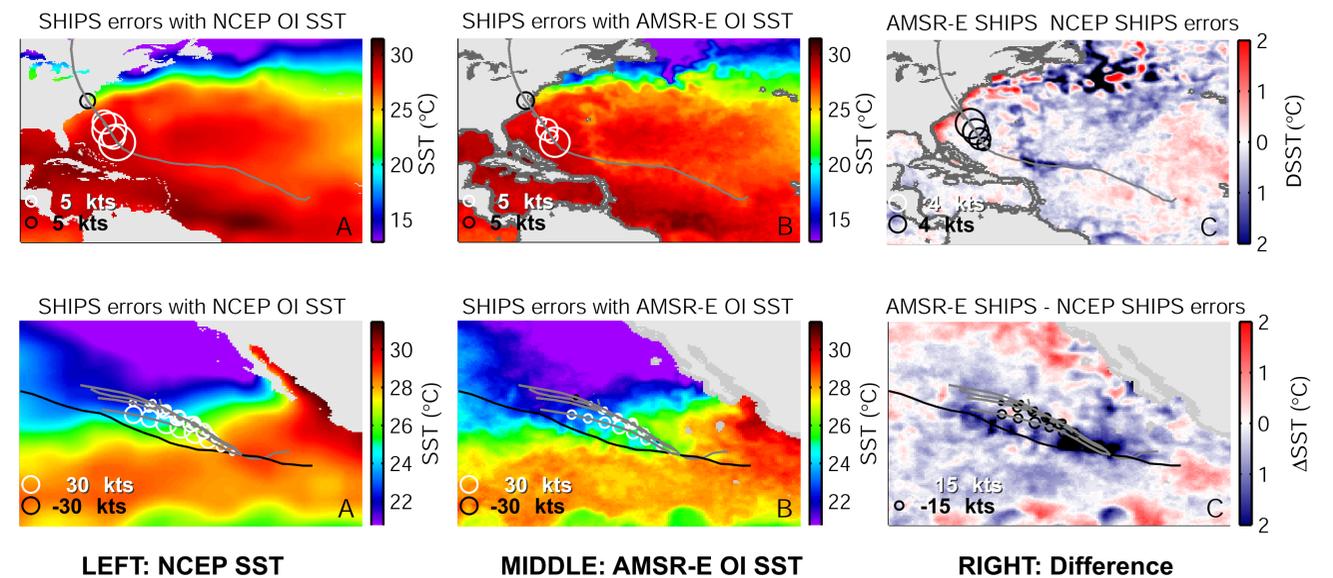


TMI rain rates (mm/hour) from RSS (**LEFT**), GPROF (**MIDDLE**), and the difference (**RIGHT**) for Hurricane Katrina just before landfall on 28 August 2005 at 03:24 Z (**TOP**) and 21:33 Z (**BOTTOM**).

RSS and GPROF are two leading instantaneous passive microwave rain retrieval algorithms. They agree well on average, but have significant structural differences.

Recent algorithm improvements are described in Hilburn, K. A., and F. J. Wentz, 2007: Intercalibrated Passive Microwave Rain Products from the Unified Microwave Ocean Retrieval Algorithm (UMORA). J. Appl. Meteor. Climatol., submitted.

Improved Intensity Predictions with Satellite SSTs



TOP: Hurricane Genevieve (28 August 2002)

BOTTOM: Hurricane Isabel (16 September 2003)

The Statistical Hurricane Intensity Prediction Scheme (SHIPS) is run operationally using NCEP SSTs that have a weekly, 100 km resolution. SHIPS uses SST to estimate the maximum possible intensity (MPI), which is one of the predictors used in the forecast. For these experiments, the SHIPS model was not "tuned" to the AMSR-E OI SSTs.

Errors are indicated by circle color and size. The white circles in the left and middle columns indicate that all forecasts over predicted storm strength. The black circles in the right columns indicate that using AMSR-E SSTs produces smaller errors than using NCEP SSTs. Using AMSR-E OI SSTs produced average forecast improvements of 11.7% (East Pacific, 2002), 7.7% (East Pacific, 2003), 0.7% (Atlantic, 2002), -2.6% (Atlantic, 2003) at 96 hours. Improvements are most dramatic when the storm passes over a previous storm's cold wake - a feature not well represented in the weekly NCEP SST product.

Tropical Cyclone Archive

Please see me (Kyle) for a demonstration!

