

Hurricane

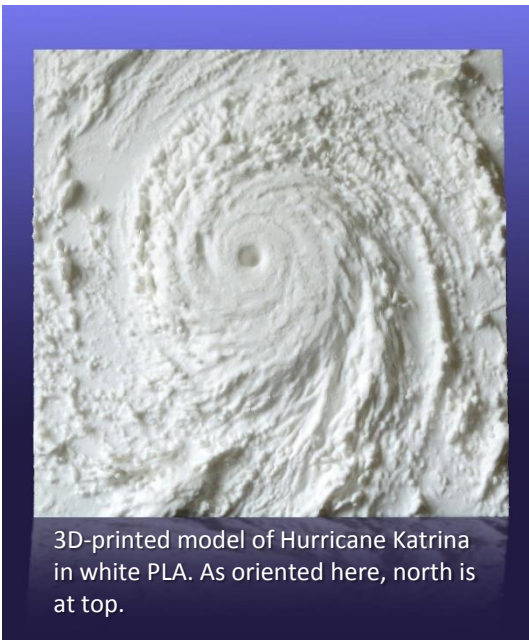
Katrina

A model for 3D printing

by Francis Reddy

Syneren Technologies Corp., Arlington, Virginia

Hurricane Katrina (2005) ranks as the costliest hurricane in U.S. history, with damages reaching \$108 billion unadjusted for inflation.¹ This model shows the storm at maximum intensity in the Gulf of Mexico on Aug. 28, 2005. It was developed by processing visible and thermal infrared images from NOAA's GOES 12 satellite acquired at 12:45 p.m. CDT (1745 UTC).²



3D-printed model of Hurricane Katrina in white PLA. As oriented here, north is at top.

At this moment, Katrina was a Category 5 storm on the Saffir-Simpson Hurricane Scale, with maximum sustained winds of 175 mph (280 km/h). The storm's center was located at 26.5° N and 88.6° W, or 255 miles (410 km) south-southeast of New Orleans, Louisiana.³ As Katrina was intensifying on the previous day, Aug. 27, NASA's Terra satellite passed over the storm. Stereo height estimates based on images captured by Terra's Multi-angle Imaging SpectroRadiometer indicate the hurricane's clouds reached to about 19 km (11.8 miles).⁴ This number was used to establish the highest point of the model, where the storm's vertical scale is exaggerated by 10 times.

Two model files are provided, at different sizes and levels of detail, along with the blended visible/infrared satellite image used to create them and printer settings used to make the print model shown above. Further details are provided below.

File	Description
Readme_Katrina.pdf	This file
Katrina.stl	Main model: 195 mm (7.7 in.) per side; scale is 1 mm = 12.06 km (7.49 mi.)
Katrina_small.stl	Half-size model: 97.5 mm (3.8 in.) per side; scale is 1 mm = 24.1 km (15 mi.)
Katrina_Vis_x_IR.jpg	Blended GOES 12 visible and infrared image, source for the model
ZYYX_PLA_process.fff	For ZYYX printers, this XML profile can be imported directly into the Simplify3D printing software. Those with other printer types may find it helpful to review these process settings in a text editor.

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Notes

1. Knabb, R. D., Rhome, J. R., Brown, D. P. (Dec. 20, 2005) [Hurricane Katrina: August 23 – 30, 2005](#). National Hurricane Center Tropical Cyclone Report.
2. Reddy, F. (April 30, 2015) *3D printing with CLASS: Making models for education and outreach using satellite weather imagery*. Poster presented at the 2015 NOAA Satellite Conference, Greenbelt, MD.
3. Pasch, R. (Aug. 28, 2005) [Hurricane Katrina intermediate advisory number 23a](#). National Hurricane Center.
4. Averill, C., Diner, D. J., Garay, M., et al. (Sept. 1, 2005) [The roiling clouds of Katrina](#). NASA's Goddard Space Flight Center.