

NASA satellites analyze Typhoon Bopha inside and out

December 5 2012

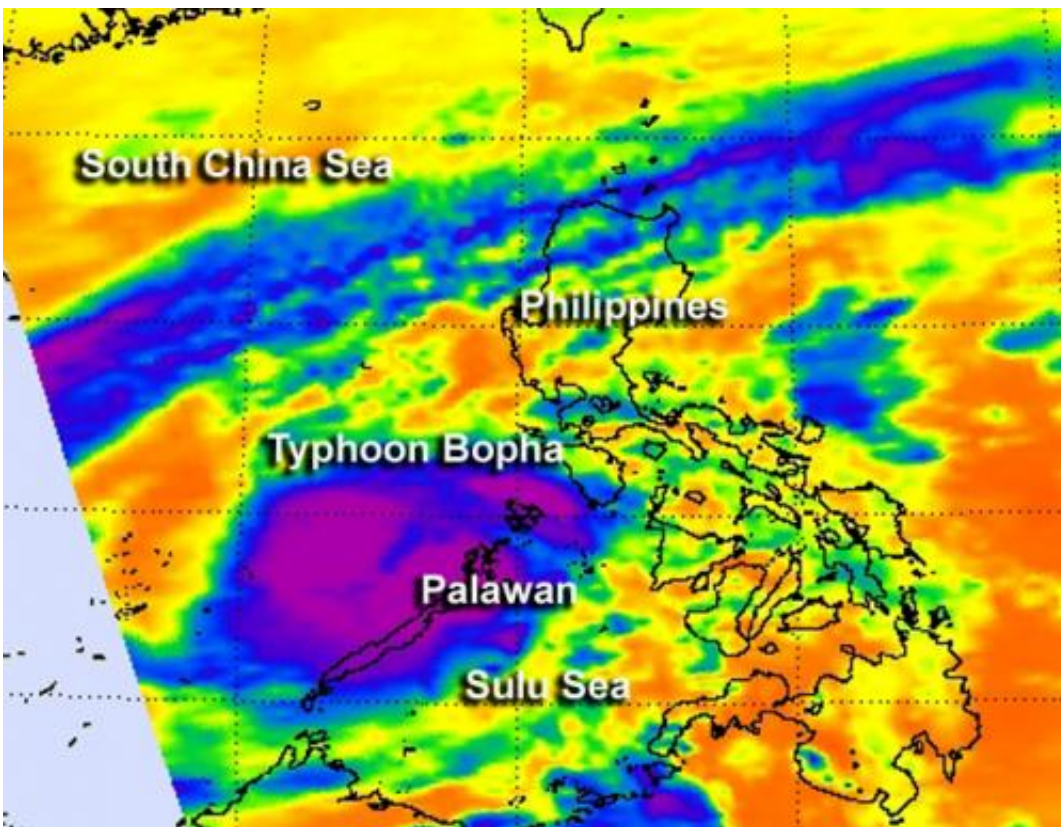


The MODIS instrument aboard NASA's Aqua satellite captured this visible image of Typhoon Bopha moving over Palawan and entering the South China Sea on Dec. 5 at 05:20 UTC (12:20 a.m. EST, U.S.). Credit: NASA Goddard's MODIS Rapid Response Team

Typhoon Bopha proved deadly to residents in the Mindanao region of

the Philippines after ravaging islands in Micronesia. NASA's Aqua and TRMM satellites peered at the storm inside and out, providing forecasters with valuable data as the storm moved into the South China Sea.

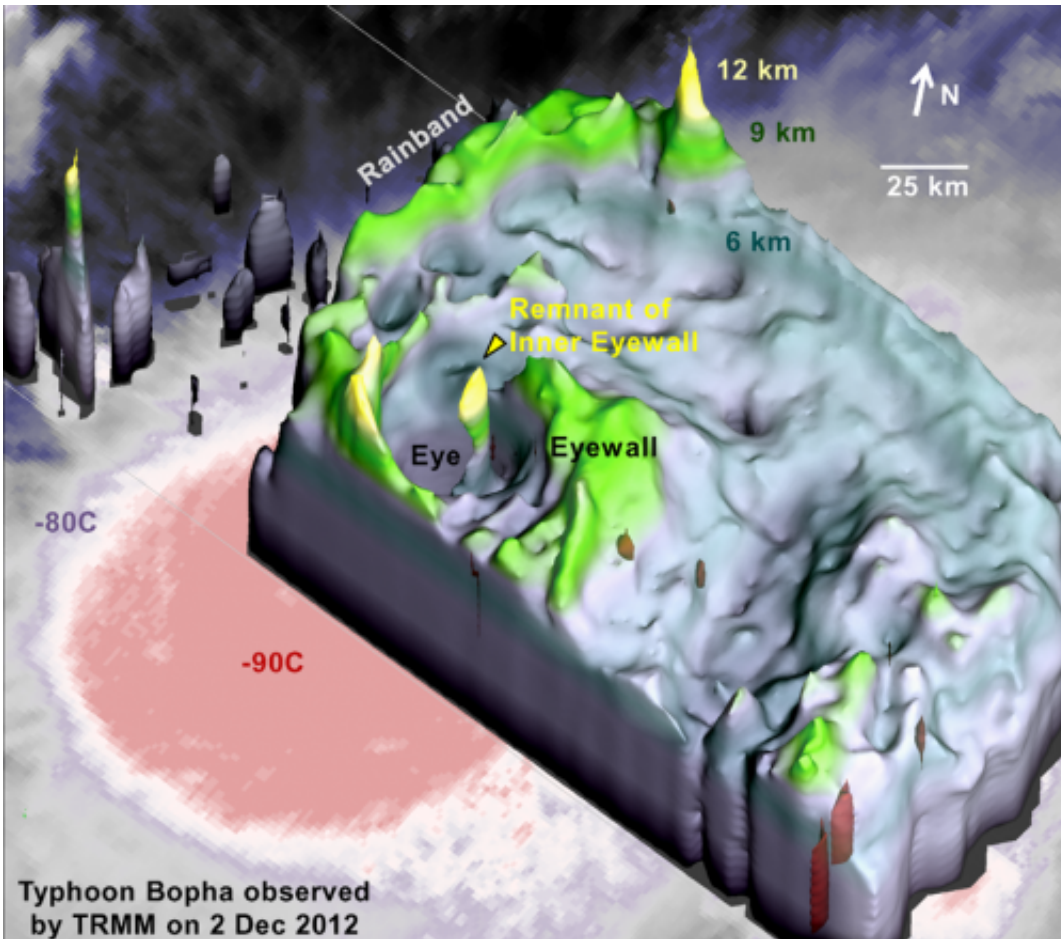
On Dec. 5, 2012, Bopha crossed over Palawan and entered the South China Sea after crossing over the southern Philippines' Mindanao region, leaving death and destruction in its wake. According to Reuters news reports on Dec. 5, at least a total of 283 people were killed and hundreds remain missing in the Philippines. The hardest-hit province in Mindanao was Compostela, where [flood waters](#) and [mudslides](#) swept through the town and killed at least 150 people. Homes were destroyed, roads were flooded and washed out, and it was estimated that as much as 80 percent of plantations were destroyed.



NASA's Aqua satellite's AIRS instrument captured this infrared view of Typhoon Bopha's cloud-top temperatures on Dec. 5 at 0517 UTC (12:17 a.m. EST) as it was exiting Palawan and moving into the South China Sea. The purple areas indicate bitterly cold cloud-top temperatures of 210 kelvin (-63C/-81F) and are areas of the strongest thunderstorms, with highest cloud tops, and heaviest rainfall. Credit: NASA JPL, Ed Olsen

On Dec. 2, 2012, NASA and the [Japanese Space Agency's Tropical Rainfall Measuring Mission \(TRMM\)](#) satellite passed over [Super Typhoon Bopha](#). Data from the overpass was used to create a 3-D image that showed that the inner eyewall was being replaced by an outer eyewall, something that typically happens in major typhoons. There was also a "hot tower" thunderstorm reaching 12 kilometers (7.4 miles) high, located north of the center of circulation. NASA research indicates that whenever a "hot tower" is spotted in a tropical cyclone, the storm usually intensifies within 6 hours. The data also indicated the highest, most powerful thunderstorms were around the center where cloud top temperatures were as cold as -90 Celsius (-130F).

On Dec. 5 at 0517 UTC (12:17 a.m. EST), the Atmospheric Infrared Sounder (AIRS) instrument that flies aboard NASA's Aqua satellite captured an [infrared view](#) of Typhoon Bopha's cloud-top temperatures as it was exiting Palawan and moving into the South China Sea. The AIRS data identified areas of bitterly cold cloud-top temperatures of 210 kelvin (-63C/-81F) where the strongest thunderstorms, with highest cloud tops, and heaviest rainfall were found. One area was located over the South China Sea and the other over northern Palawan at the time of the image.



This 3-D image of Super Typhoon Bopha was created using data from NASA's Tropical Rainfall Measuring Mission (TRMM) satellite on Dec. 2, 2012. TRMM 3-D data showed that the inner eyewall was being replaced by an outer eyewall, something that typically happens in major typhoons. There was also a "hot tower" thunderstorm reaching 12 kilometers (7.4 miles) high, located north of the center of circulation. NASA research indicates that whenever a "hot tower" is spotted in a tropical cyclone, the storm usually intensifies within 6 hours. The graphic also indicates where the highest, most powerful thunderstorms were around the center by the rounded area indicating cloud top temperatures of -90 Celsius. Credit: NASA/SSAI, Hal Pierce

Three minutes later, another instrument aboard Aqua captured a visible image of Typhoon Bopha. The image revealed that Bopha's clouds

covered the entire island of Palawan, and where the AIRS instrument revealed the coldest cloud top temperatures, those areas of clouds appeared the brightest white in the visible image, because they were higher than the surrounding clouds, and cast shadows on the lower clouds. The strongest thunderstorms have waned around the center of circulation during the early part of Dec. 5, although a tightly curved band of thunderstorms remained along the western and northern quadrants.

On Dec. 5 at 1500 UTC (10 a.m. EST) Bopha's maximum sustained winds were near 75 knots (86 mph/139 kph). It was located near 11.5 north latitude and 117.4 east longitude, about 270 nautical miles southwest of Manila, Philippines. Bopha is moving to the northwest near 11 knots (12.6 mph/20 kph) and is expected to slow down in the South China Sea.

Bopha is expected to continue tracking generally west-northwest into the South China Sea and become quasi-stationary over the next couple of days.

Provided by NASA's Goddard Space Flight Center

Citation: NASA satellites analyze Typhoon Bopha inside and out (2012, December 5) retrieved 26 April 2024 from <https://phys.org/news/2012-12-nasa-satellites-typhoon-bopha.html>

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