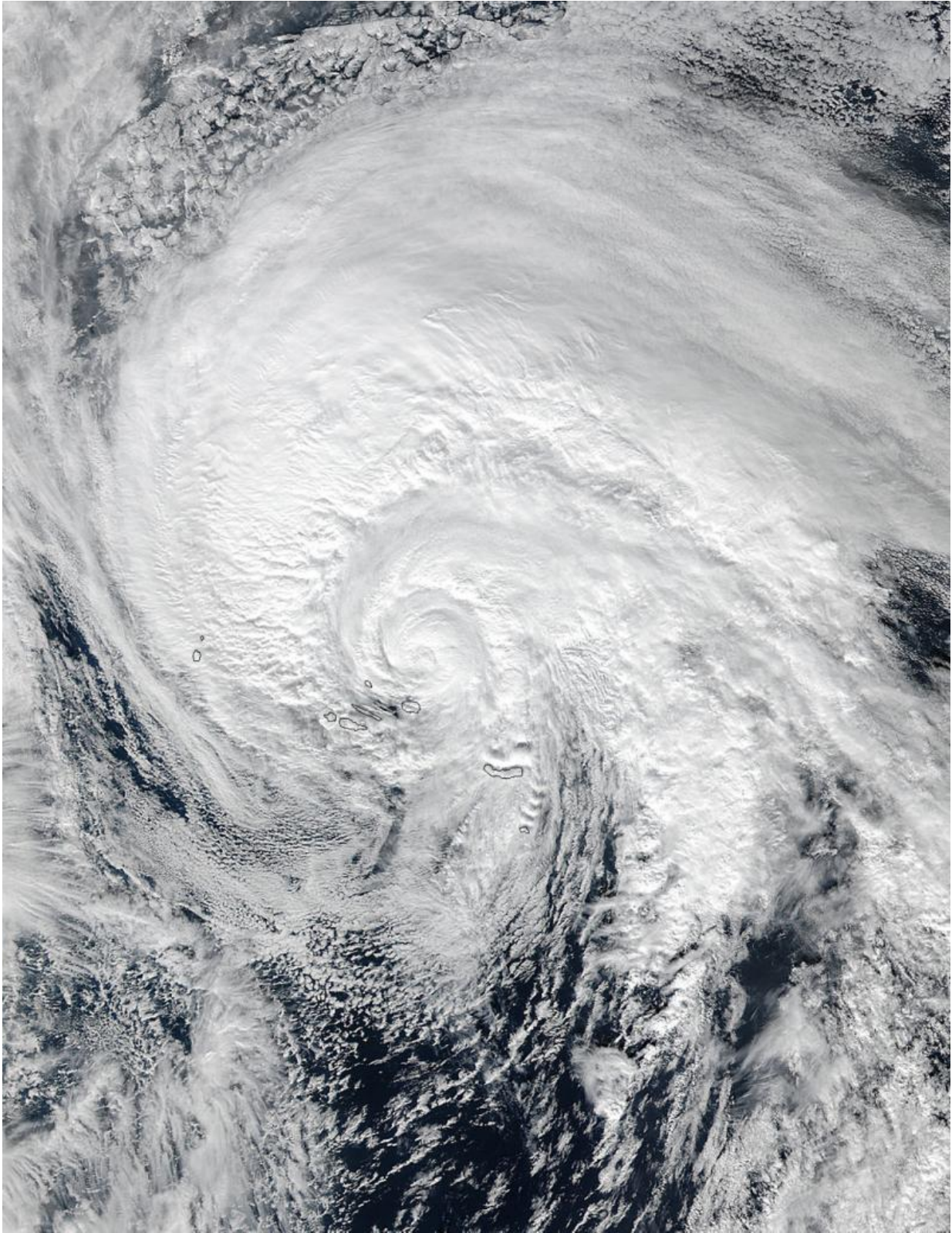


NASA provides in-depth analysis of unusual Tropical Storm Alex

January 15 2016



NASA-NOAA's Suomi NPP satellite provided this visible look at Hurricane

Alex at 14:20 UTC (9:20 a.m. EST) on Jan. 15 while it was moving over the Azores. Credit: NASA/NOAA/Jeff Schmaltz

NASA has provided forecasters with a variety of data on the out-of-season tropical cyclone Alex. The AIRS instrument aboard NASA's Aqua satellite provided valuable temperature data, the RapidScat instrument identified the strongest winds, the GPM core satellite provided rainfall rates and cloud heights, and NASA-NOAA's Suomi NPP satellite provided a visible image of the storm.

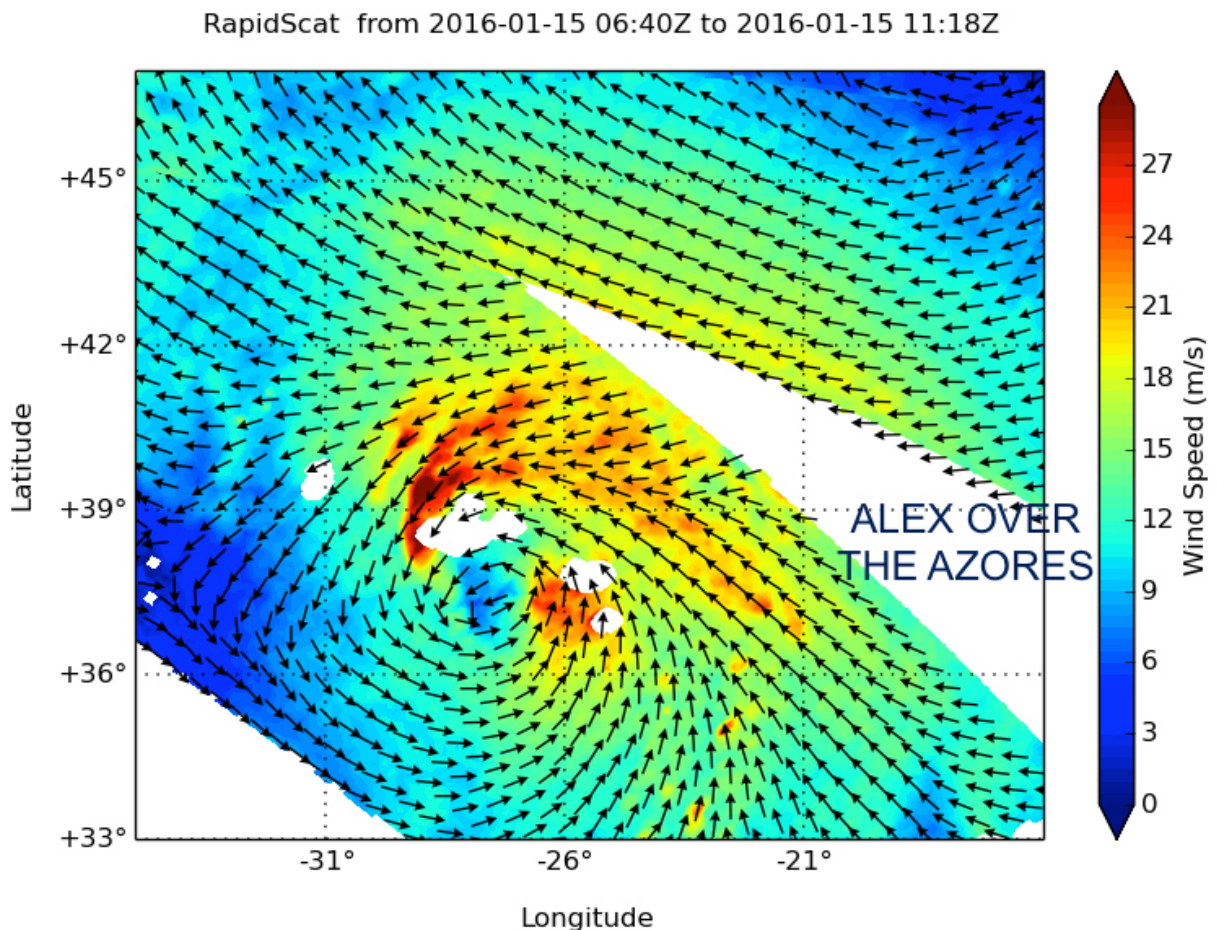
Alex is a Rare Storm

Alex officially became a [hurricane](#) on Jan. 14, 2016 at 11:00 a.m. Atlantic Standard Time (AST) with [maximum sustained winds](#) estimated at 85 mph by the National Hurricane Center (NHC), making it the earliest hurricane to form in the Atlantic since 1938, when the first [storm](#) of the season became a hurricane on January 4. As with Alex, that storm too originated from an extra-tropical low pressure center.

The last hurricane to occur in January was Hurricane Alice in 1955, but Alice had already become a hurricane in the year before at the end of December and survived into January. NHC declared Alex to be a subtropical storm on Wednesday afternoon, January 13 when it was about 785 miles south- southwest of the Azores.

Alex began from an area of low pressure that formed about a week ago along an old frontal boundary that was draped across Cuba. This low gradually moved out into the central Atlantic heading generally westward and began to produce thunderstorm activity as it started to curve northward toward the Azores. Often times, when

extra-tropical storms acquire enhanced convection the instability is due to being over warm waters, but in Alex's case it appears that the instability was due mainly to cold air aloft. At any rate, the heat release from these thunderstorms, which is known as latent heating, is what allowed Alex to eventually transform into a hurricane.



On Jan. 15 at 6 a.m. EST, RapidScat saw Hurricane Alex's strongest winds affecting some islands in the Azores. Strongest winds were (red) north and northwest of the center at 30 meters per second (67.1 mph/ 108 kph).
 Credit: NASA JPL, Doug Tyler

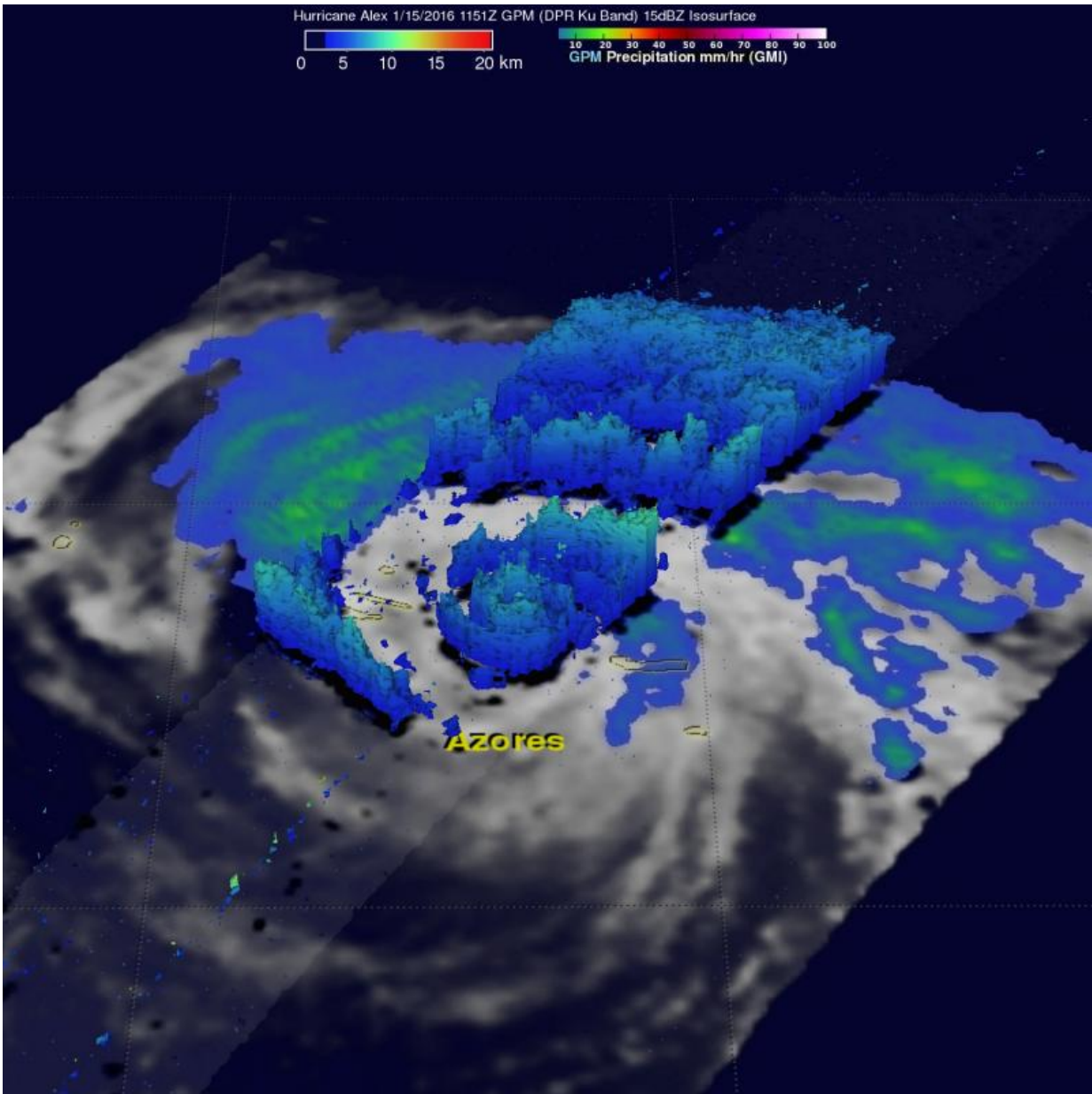
AIRS Measures Cloud Top Temperatures

The Atmospheric Infrared Sounder or AIRS instrument that flies aboard NASA's Aqua satellite measured temperatures in Hurricane Alex's cloud tops on Jan. 14 at 1429 UTC (9:29 a.m. EST). AIRS provides valuable temperature data for tropical cyclones such as cloud top and sea surface temperatures.

AIRS saw strongest storms with cloud top temperatures colder than minus 72.6 degrees Fahrenheit (minus 58.1 degrees Celsius) around the eye. NASA research has shown that storms with cloud tops that cold are powerful enough to generate heavy rain.

RapidScat Locates Strongest Winds

On Jan. 15 at 6 a.m. EST, RapidScat saw Hurricane Alex's strongest winds affecting some islands in the Azores. Strongest winds were (red) north and northwest of the center at 30 meters per second (67.1 mph/ 108 kph). Maximum sustained winds are not always equally distributed in low pressure areas and the RapidScat instrument helps forecasters find the strongest quadrants of a storm. Tropical storm force winds extend outward up to 460 miles (740 km) from the center.



Most of the rainfall measured by GPM on Jan.15 was measured at less than 20 mm (.8 inches) per hour. GPM found that maximum storm top heights northwest of Alex's cloudy eye were found to reach altitudes of 9.9 km (6.1 miles). Credit: NASA/JAXA/SSAI/Hal Pierce

RapidScat is a NASA instrument that flies aboard the International

Space Station.

GPM Satellite Measures Hurricane Alex's Rainfall

The Global Precipitation Measurement or GPM core observatory satellite flew directly above hurricane Alex on January 15, 2016 at 1151 UTC (6:51 a.m. EST) collecting data in a rainfall analysis. Alex was moving into the Azores as a category one hurricane with maximum sustained winds estimated at 70 knots (80.5 mph). GPM's Microwave Imager (GMI) and Dual-Frequency Precipitation Radar (DPR) found that rainfall intensity had decreased significantly since Alex was declared a hurricane on January 14, 2016.

Most of the rainfall measured by GPM's DPR was measured at less than 20 mm (.8 inches) per hour. Also GPM's radar (DPR Ku band) found that storm top heights were fairly low. The maximum storm top heights northwest of Alex's cloudy eye were found to reach altitudes of 9.9 km (6.1 miles).

Alex's Strength, Location and a Landfall

At 7 a.m. EST (1200 UTC) on Friday, January 15, 2016, Alex was still a hurricane with maximum sustained winds near 75 mph (120 kph). It was located near 28.0 north latitude and 26.9 west longitude, just 50 miles (80 km) south-southeast of Terceira Island in the Central Azores, and about 105 miles (170 km) east-southeast of Faial Island in the Central Azores. Alex was moving to the north at 24 mph (39 kph) and had a minimum central pressure of 986 millibars.

The National Hurricane Center stated that satellite and surface data indicate that Alex made landfall on the island of Terceira around 915 AM AST (1315 UTC) as a tropical storm with an intensity of 70 mph (110 kph).

At 10 a.m. EST (1500 UTC), the center of Tropical Storm Alex was located near latitude 39.3 North and longitude 27.0 West. Alex was moving toward the north near 28 mph (44 kph) and a turn toward the north-northwest and northwest is expected over the next day or so. The estimated minimum central pressure is 986 millibars. Maximum sustained winds dropped to near 70 mph (110 kph) making Alex a tropical storm. Little change in strength is forecast during the next 48 hours. The National Hurricane Center said that "Alex is expected to lose tropical characteristics later today (Jan. 15)."

NASA-NOAA's Suomi NPP Pictures Alex

The Visible Infrared Imaging Radiometer Suite (VIIRS) instrument aboard NASA-NOAA's Suomi NPP satellite captured a visible light image of Hurricane Alex at 14:20 UTC (9:20 a.m. EST) on Jan. 15 while it was moving through the Azores.

The image showed that the eye had become cloud-filled and bands of thunderstorms continued to circle the center of the storm, mostly in the western, northern and eastern quadrants. VIIRS collects visible and infrared imagery and global observations of land, atmosphere, cryosphere and oceans.

Alex's Future

Alex continues to accelerate and a gradual turn to the northwest is expected. On Jan. 15 Forecaster Pasch of NOAA's National Hurricane Center said that the post-tropical cyclone is forecast to merge with or become absorbed by another extra-tropical low within two days. For updates, visit NHC: <http://www.nhc.noaa.gov>

Provided by NASA's Goddard Space Flight Center

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