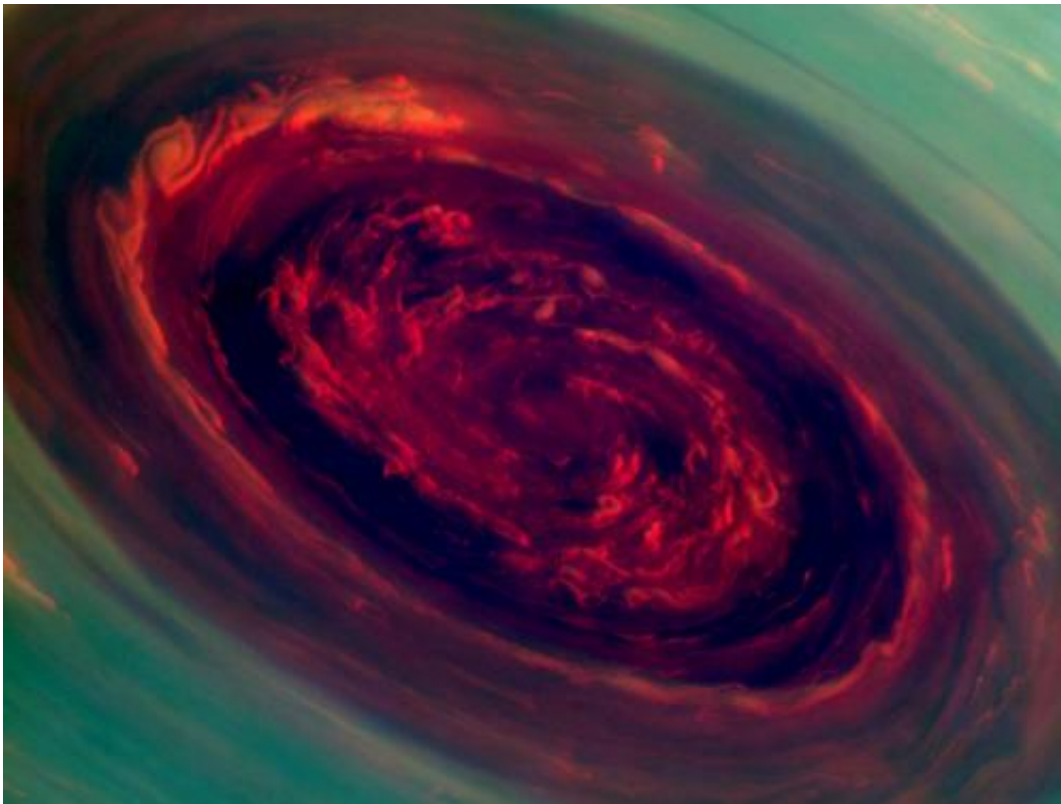


# Cassini probe gets close views of large Saturn hurricane (w/ video)

April 29 2013, by Jia-Rui Cook

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The spinning vortex of Saturn's north polar storm resembles a deep red rose of giant proportions surrounded by green foliage in this false-color image from NASA's Cassini spacecraft. Measurements have sized the eye at a staggering 1,250 miles (2,000 kilometers) across with cloud speeds as fast as 330 miles per hour (150 meters per second). This image is among the first sunlit views of Saturn's north pole captured by Cassini's imaging cameras. When the spacecraft arrived in the Saturnian system in 2004, it was northern winter and the north pole was in darkness. Saturn's north pole was last imaged under sunlight by NASA's Voyager 2 in 1981; however, the observation geometry did not allow for detailed views of the poles. Consequently, it is not known how long this newly discovered

north-polar hurricane has been active. The images were taken with the Cassini spacecraft narrow-angle camera on Nov. 27, 2012, using a combination of spectral filters sensitive to wavelengths of near-infrared light. The images filtered at 890 nanometers are projected as blue. The images filtered at 728 nanometers are projected as green, and images filtered at 752 nanometers are projected as red. In this scheme, red indicates low clouds and green indicates high ones. The view was acquired at a distance of approximately 261,000 miles (419,000 kilometers) from Saturn and at a sun-Saturn-spacecraft, or phase, angle of 94 degrees. Image scale is 1 mile (2 kilometers) per pixel. The Cassini-Huygens mission is a cooperative project of NASA, the European Space Agency and the Italian Space Agency. NASA's Jet Propulsion Laboratory, a division of the California Institute of Technology in Pasadena, manages the mission for NASA's Science Mission Directorate, Washington, D.C. The Cassini orbiter and its two onboard cameras were designed, developed and assembled at JPL. The imaging operations center is based at the Space Science Institute in Boulder, Colo. Credit: NASA/JPL-Caltech/SSI

(Phys.org) —NASA's Cassini spacecraft has provided scientists the first close-up, visible-light views of a behemoth hurricane swirling around Saturn's north pole.

In high-resolution pictures and video, scientists see the hurricane's eye is about 1,250 miles (2,000 kilometers) wide, 20 times larger than the average hurricane eye on Earth. Thin, bright clouds at the outer edge of the hurricane are traveling 330 mph (150 meters per second). The hurricane swirls inside a large, mysterious, six-sided [weather pattern](#) known as the [hexagon](#).

"We did a double take when we saw this vortex because it looks so much like a hurricane on Earth," said Andrew Ingersoll, a Cassini imaging team member at the California Institute of Technology in Pasadena. "But there it is at Saturn, on a much larger scale, and it is somehow getting by

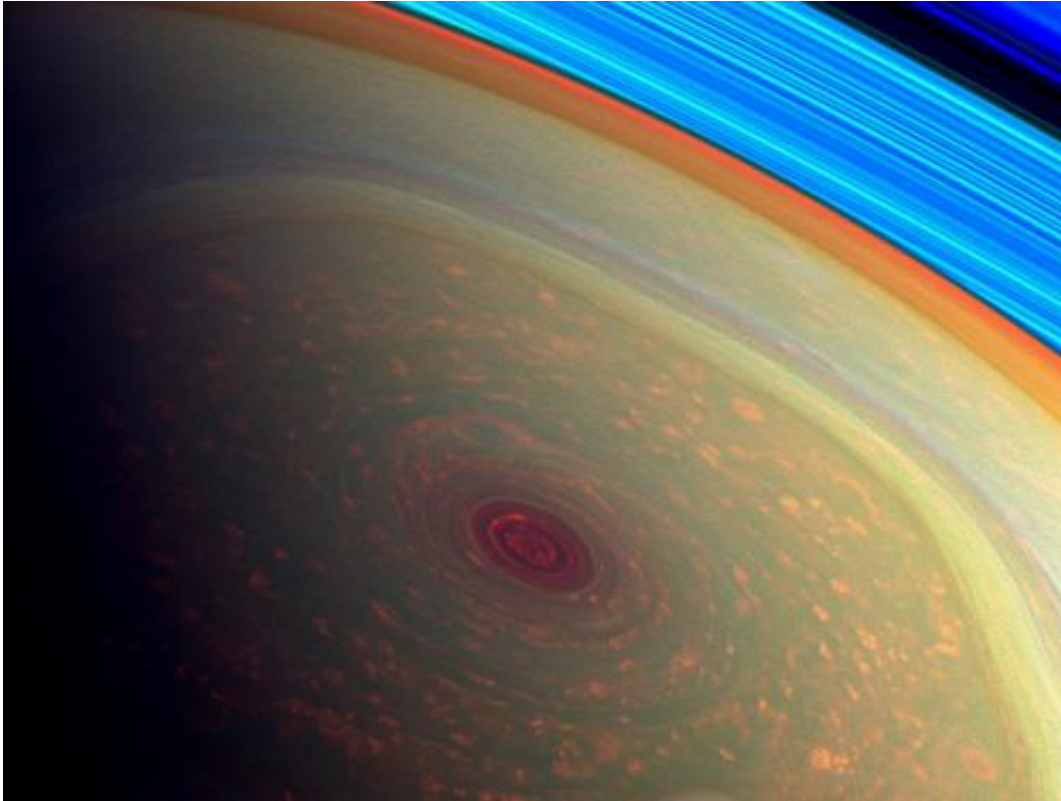
on the small amounts of [water vapor](#) in Saturn's hydrogen atmosphere."

Scientists will be studying the hurricane to gain insight into hurricanes on Earth, which feed off warm ocean water. Although there is no body of water close to these clouds high in Saturn's atmosphere, learning how these Saturnian storms use water vapor could tell scientists more about how terrestrial hurricanes are generated and sustained.

Both a terrestrial hurricane and Saturn's north polar vortex have a central eye with no clouds or very low clouds. Other similar features include high clouds forming an eye wall, other high clouds spiraling around the eye, and a counter-clockwise spin in the northern hemisphere.

A major difference between the hurricanes is that the one on Saturn is much bigger than its counterparts on Earth and spins surprisingly fast. At Saturn, the wind in the eye wall blows more than four times faster than hurricane-force winds on Earth. Unlike terrestrial hurricanes, which tend to move, the Saturnian hurricane is locked onto the planet's north pole. On Earth, hurricanes tend to drift northward because of the forces acting on the fast swirls of wind as the planet rotates. The one on Saturn does not drift and is already as far north as it can be.

"The polar hurricane has nowhere else to go, and that's likely why it's stuck at the pole," said Kunio Sayanagi, a Cassini imaging team associate at Hampton University in Hampton, Va.



This spectacular, vertigo inducing, false-color image from NASA's Cassini mission highlights the storms at Saturn's north pole. The angry eye of a hurricane-like storm appears dark red while the fast-moving hexagonal jet stream framing it is a yellowish green. Low-lying clouds circling inside the hexagonal feature appear as muted orange color. A second, smaller vortex pops out in teal at the lower right of the image. The rings of Saturn appear in vivid blue at the top right. The images were taken with Cassini's wide-angle camera using a combination of spectral filters sensitive to wavelengths of near-infrared light. The images filtered at 890 nanometers are projected as blue. The images filtered at 728 nanometers are projected as green, and images filtered at 752 nanometers are projected as red. At Saturn, this scheme means colors correlate to different altitudes in the planet's polar atmosphere: red indicates deep, while green shows clouds that are higher in altitude. High clouds are typically associated with locations of intense upwelling in a storm. These images help scientists learn the distribution and frequencies of such storms. The rings are bright blue in this color scheme because there is no methane gas between the ring particles and the camera. The view was acquired at a distance of approximately 261,000 miles (419,000 kilometers) from Saturn and at a sun-Saturn-spacecraft, or phase, angle of 94 degrees. Image scale is 13 miles (22 kilometers) per pixel. Image Credit:

Scientists believe the massive storm has been churning for years. When Cassini arrived in the Saturn system in 2004, Saturn's north pole was dark because the planet was in the middle of its north polar winter. During that time, the [Cassini spacecraft](#)'s composite infrared spectrometer and visual and infrared mapping spectrometer detected a great vortex, but a visible-light view had to wait for the passing of the equinox in August 2009. Only then did sunlight begin flooding Saturn's northern hemisphere. The view required a change in the angle of Cassini's orbits around Saturn so the spacecraft could see the poles.

"Such a stunning and mesmerizing view of the [hurricane](#)-like storm at the [north pole](#) is only possible because Cassini is on a sportier course, with orbits tilted to loop the spacecraft above and below Saturn's equatorial plane," said Scott Edgington, Cassini deputy project scientist at [NASA](#)'s Jet Propulsion Laboratory in Pasadena, Calif. "You cannot see the polar regions very well from an equatorial orbit. Observing the planet from different vantage points reveals more about the cloud layers that cover the entirety of the planet."

Cassini changes its orbital inclination for such an observing campaign only once every few years. Because the spacecraft uses flybys of Saturn's moon Titan to change the angle of its orbit, the inclined trajectories require attentive oversight from navigators. The path requires careful planning years in advance and sticking very precisely to the planned itinerary to ensure enough propellant is available for the spacecraft to reach future planned orbits and encounters.

Provided by NASA

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