

CASSINI-HUYGENS

Saturn's polar hexagon

The image shows a polar projection of Saturn's northern high latitudes in the 750-nm near-infrared filter of the Imaging Science Subsystem (ISS) camera onboard the Cassini orbiter. The image consists of a mosaic of eleven images captured on 6 January 2009. A hexagonal cloud feature stands out prominently; the feature has been known as the hexagon on Saturn, which was originally discovered in Voyager images captured during 1980–1981. Since then, the feature was seen in the 1990s using the Hubble Space Telescope after its launch in 1990 until the north pole went out of view after the equinox of 1995, and was not seen again until the Cassini spacecraft went into orbit around Saturn in 2004. When Cassini arrived at Saturn, the north polar region was still in winter polar night, and the hexagon could be detected only in thermal and mid-infrared emissions.

As Saturn approached the equinox of 2009, sunlight started illuminating the hexagon region; this mosaic is the first observation by Cassini of the hexagon illuminated by the Sun. The centre of the image appears dark because the north pole was not yet illuminated at the time. The hexagonal pattern is the meandering path of an atmospheric jet stream that blows at those latitudes. Multiple mechanisms have been proposed to explain its shape and near-perfect symmetry. Numerical as well as laboratory experiments have revealed that the vertical structure of the jet and the atmospheric stratification are important factors: when those physical effects are taken into account, a persistent wavenumber-6 pattern can be reproduced in numerical models as well as laboratory tanks. The vertical jet structure and atmospheric stratification are difficult to determine from observation,

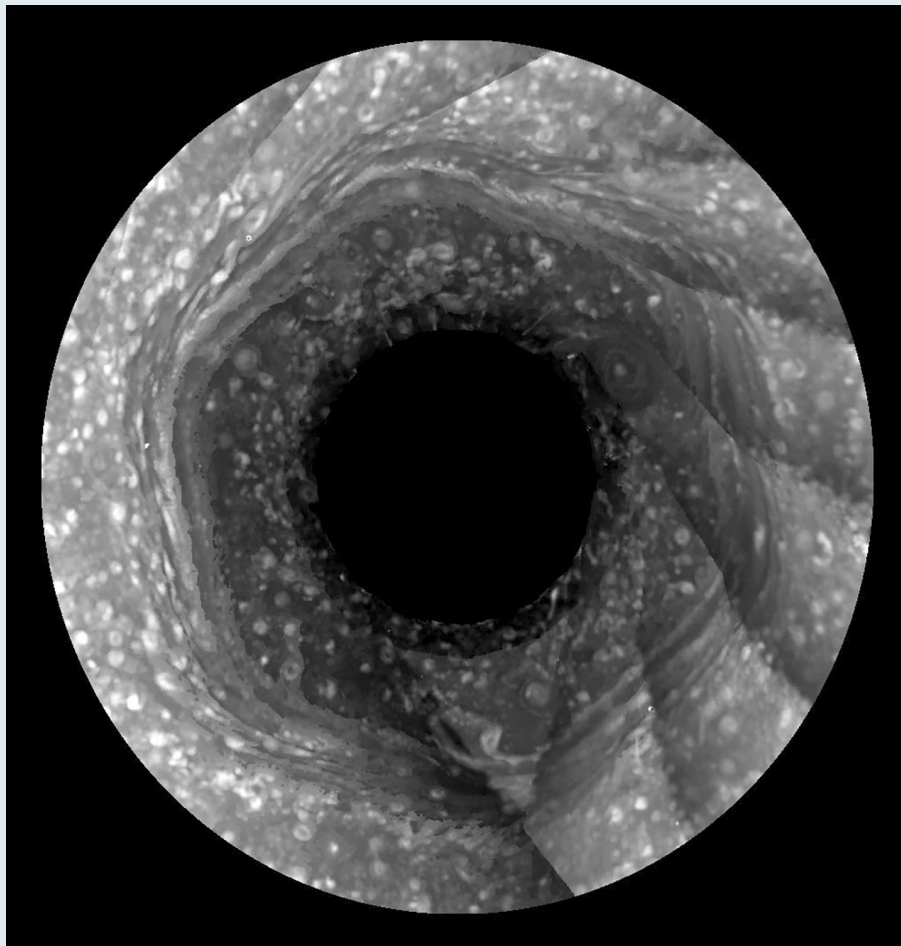


Image credit: NASA/JPL/Space Science Institute

so these numerical experiments help our understanding of the atmosphere of Saturn at a depth that we cannot observe. Continued imaging from the Cassini orbiter has revealed that its colour changed gradually from bluish to golden as the north pole approached the summer solstice of May 2017.

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