

Saturn 2018

Saturn's Dynamic Atmosphere

Famous for its series of stunning rings, Saturn has fascinated astronomers for centuries. The planet's rings were first identified as a continuous disk around the planet by Dutch astronomer Christiaan Huygens in 1655. Increasingly powerful Earthbound telescopes later revealed as many as seven distinct ring groups separated by gaps. During a flyby of Saturn in 1980, NASA's Voyager 1 resolved thousands of thin, fine ringlets within each group.

Voyager also spotted a famous geometric feature on Saturn that has never been seen on any other planet: a strange and mysterious six-sided wind pattern at the planet's north pole, nicknamed "the hexagon."

In July 2004, high-resolution images from NASA's Cassini Saturn orbiter confirmed the existence of the persistent feature. The observations also revealed a huge hurricane in the middle of the hexagon, with an eye, or center, about 50 times larger than typical hurricane eyes on our own planet. The hexagon itself is so large that four Earths could fit inside its boundaries.

The hexagon (the large, dark-edged feature at the north pole in the front image) was seen again in June 2018 as NASA's Hubble Space Telescope was taking images of the ringed planet near its closest approach to Earth. The image was taken during summer in Saturn's Northern Hemisphere, when the planet's upper region is tilted toward the Sun and gets the most sunlight. The white clouds seen in the planet's northern polar region are the remnants of a disintegrating storm that may have been triggered by an increase in sunlight.

Astronomers have used Hubble over its long lifetime to study Saturn's atmosphere, and more than two decades of Hubble observations have helped map Saturn's seasons in detail. Like Earth, Saturn experiences seasonal changes due to its axial tilt. Earth is tilted at a 23-degree angle, and Saturn has a 27-degree tilt. However, because Saturn takes about 29 Earth years to complete a full orbit around the Sun, each season lasts over seven years.

This portrait of Saturn is the first image of the planet taken as part of the Outer Planet Atmospheres Legacy (OPAL) project. OPAL is helping scientists understand the atmospheric dynamics and evolution of our solar system's giant planets.

Credits: NASA, ESA, A. Simon (GSFC) and the OPAL Team, and J. DePasquale (STScI)

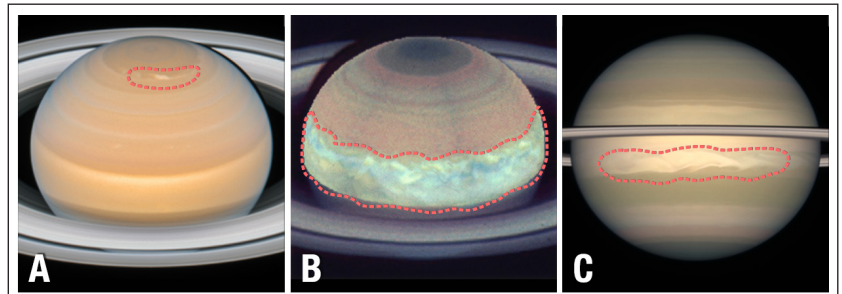
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Over the decades, Hubble has observed many storms across the latitudes of Saturn, as seen in this sample of images. The storms traversing the hemispheres in each image are likely caused by Saturn's seasonal changes. Summertime in each hemisphere causes an increase in sunlight, which heats the ringed giant's atmosphere and helps power storm activity.

Image **A** is a close-up view of a large storm disintegrating in the planet's northern polar region. Image **B** shows a large storm lower in the Northern Hemisphere that extends around the entire planet. The colors were enhanced to bring out the contrast in the storm. Image **C** reveals storms in Saturn's Southern Hemisphere, as evidenced by a band of stretched, white clouds just below the planet's equator.

Credit for Hubble images: NASA, ESA, A. Simon (GSFC) and the OPAL Team, and J. DePasquale (STScI)

VOCABULARY

Season: A division in a planet's year that is marked by changes in weather and the amount and intensity of daylight. Seasons result from a planet's axial tilt and its orbit around the Sun.

Latitude: In geography, latitude is a geographic coordinate that specifies the north-south position of a point on a planet's surface. Latitude is an angle that ranges from 0 degrees at the equator to 90 degrees (north or south) at the poles.

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