NASA SCIENCE HIGHLIGHT: Science Mission Directorate (SMD)

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NASA Science Highlight: Planetary Program Support

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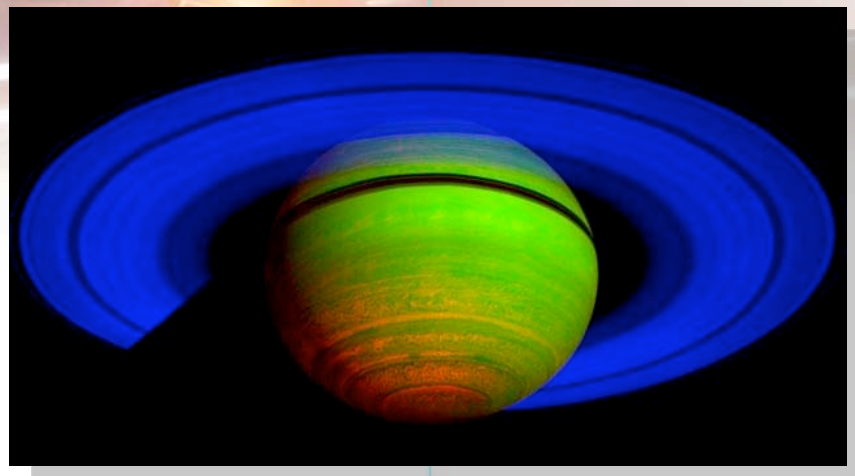
Cassini Discovers Saturn to Vary its Energy Output



This false-color composite image, constructed from data obtained by NASA's Cassini spacecraft, shows Saturn's rings and southern hemisphere.

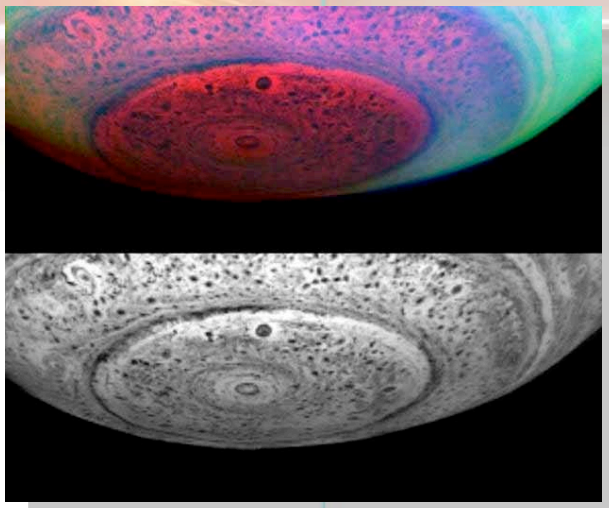
Saturn is a changeable world that pumps out surprisingly variable amounts of heat from season to season and year to year, a new study has found. Like a cosmic light bulb on a dimmer switch, Saturn was slowly cooling down and emitted gradually less energy each year from 2005 to 2009, according to observations by NASA's Cassini spacecraft.

These never-before-seen trends came from a detailed analysis of long-term data from Cassini’s Composite Infrared Spectrometer (CIRS), as well as a comparison with earlier data from NASA's Voyager spacecraft.

Saturn's energy output also changed with the planet's seasons, and its pattern differed from the early 1980s, the last time a spacecraft visited the planet. Saturn's outgoing energy flow was lopsided, with the southern hemisphere giving off about one-sixth more energy than the northern half from 2005 to 2009, which somewhat matched up with Saturn’s seasons. Saturn takes nearly 30 Earth years to orbit the sun, so one season on the ringed planet lasts about seven Earth years.

The scientists reported their results recently in the Journal of Geophysical Research-Planets.

Cassini Discovers Saturn to Vary its Energy Output (Cont'd)



These two infrared images of Saturn show the entire south polar region with the hurricane-like vortex in the center.

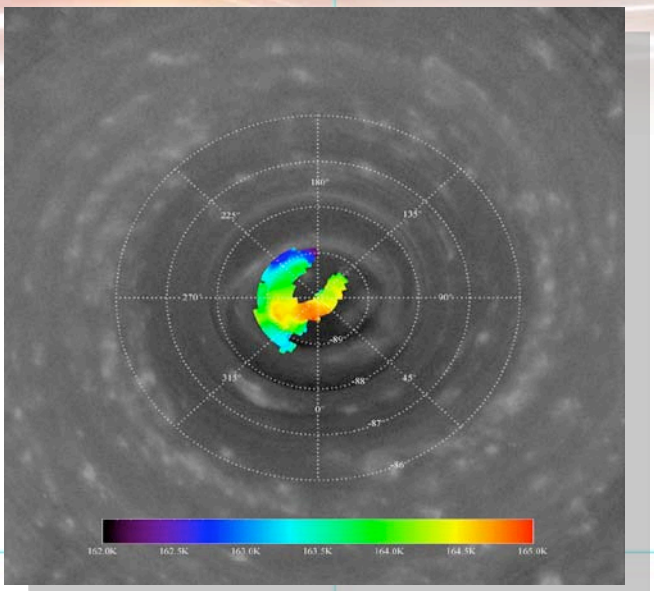
Different than it used to be

The researchers wanted to know if such trends on Saturn change over time, so they looked at observations made by NASA's Voyager Spacecraft in 1980 and 1981, which was about one Saturnian year ago.

They didn't see the same imbalance between the southern and northern hemispheres. Instead, the two regions were much more consistent with each other.

One possible explanation is that Saturn's cloud patterns fluctuated, blocking and scattering infrared light differently. However, to fully understand what is happening on Saturn, it is necessary to understand the amount of energy being absorbed by the planet.

Cassini Discovers Saturn to Vary its Energy Output (Cont'd)



CIRS's temperature map of Saturn's South Pole region

Implications:

When combined with information about the energy coming to Saturn from the sun, the results could help scientists understand the nature of Saturn's internal heat source.

Significance to Solar System Exploration:

A better understanding of Saturn's internal heat flow will significantly deepen our understanding of the weather, internal structure and evolution of Saturn and the other gas giant planets.