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Saturn's Polar Hexagon at depth: New images of stationary planetary waves in the North Polar Region by Cassini/VIMS

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We present new imagery of cloud and wave systems at depth near the 3-bar level in the north polar region of Saturn, obtained by the Visual Infrared Mapping Spectrometer (VIMS) onboard the Cassini/Huygens orbiter. These images were taken in Saturn's own indigenous thermally-generated light at a wavelength of 5 micron which allows the thick clouds at depth to be seen silhouetted against the upwelling radiation under the present nighttime conditions of north polar winter. Saturn's Polar Hexagon, discovered in Voyager imagery by Godfrey (Icarus 76, 335-356, 1988), is a prominent feature in these images, indicating that the feature extends at least several bars of pressure down into the atmosphere. The re-acquisition of this feature near 77.5 degrees planetocentric latitude indicates that the hexagon is a multi-decade, long-lived feature which survives the Saturn seasons. A second hexagon, significantly darker at 5 micron than the brighter historical feature, is located near 74.2 degrees planetocentric latitude. The clouds in the 5-micron-bright hexagon are relatively deep: 3.5 bars compared to the 2.5-3.0-bar level of clouds in the dark hexagon. Observed three times over a 12-day period between October 29 and November 10, 2006, both hexagonal features stay fixed in a rotational system defined by the Voyager-era radio rotation rate (Desch and Kaiser, Geophys. Res. Lett, 8, 253-256, 1981) to within an accuracy of 11 seconds per rotational period. This agrees with the stationary nature of the wave in this rotation system found by Godfrey (1988), but is inconsistent with more recent

Saturn rotation rates found during the current Cassini era. Together with our new constraints on the depth of the feature, this result indicates that the feature is not linked to Saturn's radio emissions nor to auroral activity as speculated by Godfrey. (1988). Images of these and other discrete features – including the north polar aurarae - will be shown and discussed.