

Seasonal Changes in Surface Temperatures on Titan

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Abstract

The surface brightness temperatures on Titan have been measured by the Composite Infrared Spectrometer (CIRS) aboard Cassini during the period spanning late northern winter through vernal equinox. CIRS observes radiance from the surface through a spectral window at 19 microns where the atmosphere has an opacity minimum [1]. CIRS is now seeing a shift in the latitudinal distribution of temperatures from a distinctly warmer south to a more symmetrical north-south pattern, similar to that found by Voyager IRIS [2,3] at the time of the previous vernal equinox. Near the equator the temperatures remain close to the 93.7 K value found at the surface by Huygens [4]. From the equator to the poles the temperature gradients are 2-3 K. When compared with predictions from general circulation models [5] the measured temperatures and their seasonal changes constrain the possible types of surface material. As Cassini continues through Titan's northern spring CIRS will extend its global coverage to look for correlations between surface temperatures and albedo and to search for diurnal temperature variations.

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