

# Surface Reflectance Change on Titan: Implications for Atmospheric and Volcanic Activity

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Regional changes in the near-infrared reflectance of a 2800 km<sup>2</sup> area on Titan occurred between July 2004 and October of 2005. Cassini's Visual and Infrared Imaging Spectrometer observed a flux increase by a factor of two between July 2004 and March-April 2005; then a decrease through October 2005. The character is inconsistent with tropospheric clouds of the type observed at Titan's South pole and high mid-latitudes. Application of a comprehensive radiative transfer model finds that it is unlikely to be caused by a ground fog and most likely occurred at Titan's surface. This is the first direct evidence of short-term surface change on Titan. Inspection of the spectral differences between the spot and its surrounding terrain rules out changes in the distribution of the ices of H<sub>2</sub>O, CO<sub>2</sub>, and CH<sub>4</sub> as the cause. Interpretations include changing surface deposits due to abrupt tectonic or volcanic activity. This is the first evidence for currently active tectonic processes such as volcanism on Titan.

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