

Distributions of atmospheric molecules on the surface of the Saturnian moon, Iapetus

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Abstract

The close flyby observations of Iapetus by the Cassini spacecraft on December 31, 2004, during the Saturn Orbit Insertion have brought many exciting new results. Of particular interest for the atmospheric and surface properties of this icy Saturnian moon has to do with the discovery of CO₂ ice in the form of mixtures in water ice and other substances by the infrared mapping spectrometer. This finding has drawn attention to the possible presence of polar ice caps and a CO₂ exosphere. In addition, the existence of very tenuous atmosphere composed of other species like O₂ and N₂ cannot be ruled out. In this paper we will report on our results from the numerical simulations of the ballistic transport of volatile species on the surface of Iapetus. This work is performed with a view to compare with the measurements of the ion and neutral mass spectrometer during the next close flyby in September 2007.

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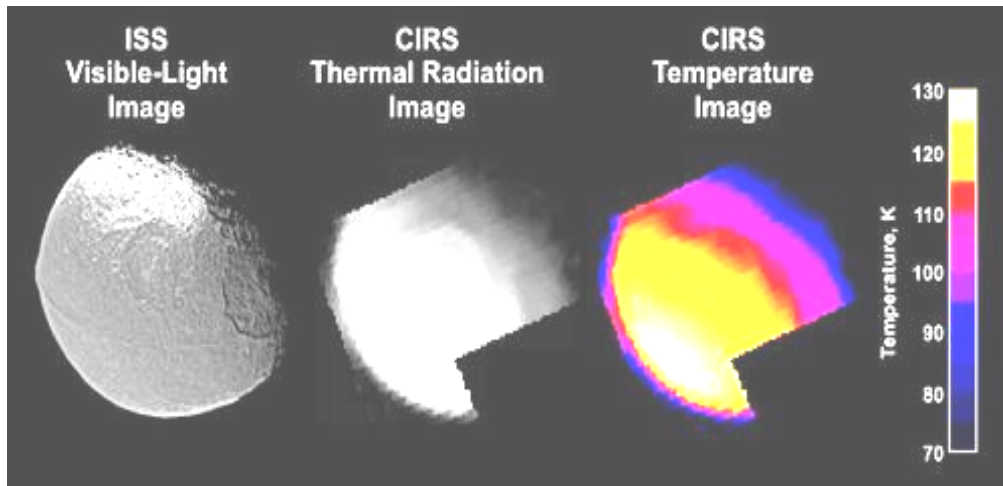


Figure 1. Iapetus Thermal Mapping Image. The highest temperature of subsolar point in dark hemisphere reaches ~130 K.

From:<http://saturn.jpl.nasa.gov/science/moons/index.cfm>