DPS 2001 meeting, November 2001
Session 5. Cassini and Galileo at Jupiter II
Oral, Chairs: R. Lopes, A. Simon-Miller, Tuesday, November 27, 2001, 2:00-3:20pm, Regency E

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[5.07] Temperature-Area Determination from Observations of Loki by Galileo and Cassini

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At the dawn of the new millennium the Cassini and Galileo spacecraft both observed the Jovian satellite Io, and collected data of thermal emission from Loki, the Solar System's most powerful volcano, in darkness. This has enabled the thermal modelling of data, obtained at different wavelengths and by different spacecraft, of the same target. The Galileo Near Infrared Mapping Spectrometer (NIMS) obtained low spatial resolution (~ 600 km/pixel) data of Loki at 12 wavelengths in the infrared (~ 2 to 5.2 microns). Fits of a two-temperature black-body thermal model reveal a relatively small area (~ 1 km^2) at a temperature of approximately 1000 K, indicative of silicate volcanism, and a larger area (2300 km^2) at 417 K. However, the lack of short-wavelength data means that the short-wavelength emission is poorly constrained, and the uncertainty of the fit is great. However, the Cassini Imaging Science Subsystem (ISS) also observed Loki in darkness, and detected thermal emission in the clear filter. This meant that at least part of Loki was in excess of 800 K. Also, little or no thermal emission was detected in the IR filter, which provides a lower thermal emission output condition. The quantification of thermal emission from the Cassini observation will allow constraints on temperature and area to be determined from fits to the combined NIMS-ISS dataset, a technique already proven using Galileo NIMS and SSI data (Davies et al., 1997, GRL, 24, 2447-2450).

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