

Lava Lakes on Io

J. Rathbun and J. Spencer

Io, a satellite of Jupiter, is the most volcanically active body in the solar system. Loki is the most energetic volcano on Io, and its thermal emission can be seen from ground-based telescopes such as the IRTF.

The thermal emission from Loki has been monitored for more than 15 years. Curiously, it has been observed to brighten by an order of magnitude on a regular interval of 540 days. This periodic behavior also matches data obtained by spacecraft. The favored explanation is that Loki is a lava lake, which overturns every 540 days when the solidified crust becomes gravitationally unstable. The most recent IRTF data, however, do not match the 540-day period, and we are currently working to explain what may be happening.

These observations, gathered over a long time period, will ultimately help us to understand the lifetime of volcanoes on Io, the nature of the lava production and resurfacing of Io, and the total energy output of volcanoes on Io.

This is a good example of the value of ground-based observations in complementing the data returned from spacecraft.

