

Continued Observations of Io's Volcanic Activity

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Abstract

During the Galileo era Jupiter's satellite Io was observed frequently by Galileo, HST and groundbased telescopes. Since the demise of Galileo in 2003, and the arrival of Cassini in the saturnian system, the frequency of Io observations has been drastically diminished. A short revival was seen during the New Horizon flyby in 2007. However, if we ever hope to solve questions with regard to Io's heat flow and active volcanism, including the composition of erupting magmas and volcanic plumes, we need to continue to regularly observe this satellite. Obtaining such data is not easy, since large telescope are heavily oversubscribed. Hence observations may need to be inserted during other observing sessions.

In this presentation we will present recent results from groundbased observations, in an attempt to renew interest in this volcanically active body. We will show results on the overall SO₂ ice distribution on Io's surface, volcanic eruptions at different temperatures, and eclipse measurements.

We will further advocate that future jovian missions carry a large (0.5-1.5 m sized) telescope with several backend instruments, rather than several small instrument-specific cameras, to study this body in detail while in orbit about Jupiter, Europa or Ganymede. Of course, the large telescope would be advantageous not only for Io but also to study other satellites, rings and Jupiter's atmosphere. With such a system Io can be monitored continuously, and observations are not limited to close flybys. Observing Io from a jovian orbit rather than from the ground adds the advantage that the satellite can be observed in eclipse (or at night) at 'will', observations which from the ground are limited to one particular hemisphere (Loki) of the body.

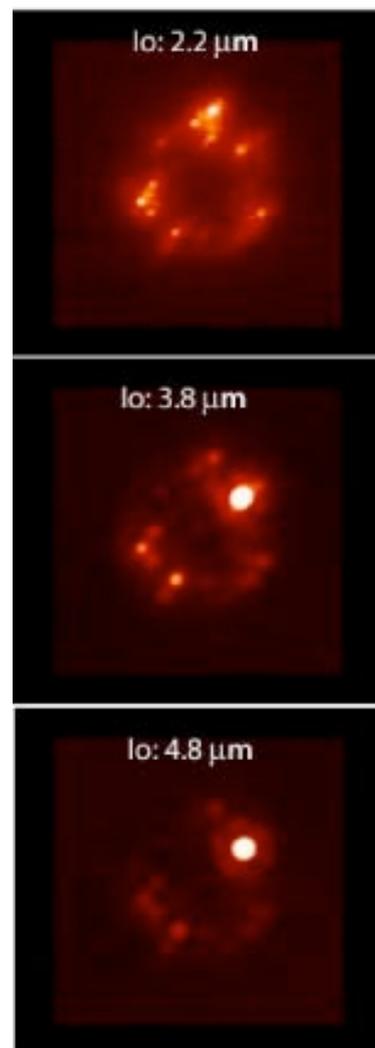


Figure 1. Io in eclipse as observed at different wavelengths with the Adaptive Optics system on the Keck telescope, 11 May 2008. The L-M bright spot is Loki.