

Volcanism on Io: Global Distribution and Activity of Hot Spots Observed during the Galileo mission

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The Galileo mission has provided an unprecedented opportunity to monitor Io's volcanic activity over a wide range of wavelengths and over timescales ranging from hours to years. A vigorous ground-observing program, operating concurrently with Galileo, has posed additional constraints on the variability of the thermal activity of Io's volcanoes. Results from the Galileo mission can be combined with those from the Voyager flybys in 1979 and from the ground-observing program in the years between Voyager and Galileo, providing a long-term view of Io's volcanic activity. We will present a summary of results from Galileo's Near-Infrared Mapping Spectrometer's (NIMS) on Io's hot spot activity, which include the detection of 19 hot spots not known from Voyager or ground-based observations, as well as of several hot spots previously known. These results are compared with detections of spots, plumes, red-colored deposits, and other morphological changes by Galileo's Solid State Camera (SS1). The two data sets can be used to place temperature and area constraints on hot spots, study their distribution on the surface of Io, and correlate hot spot locations with those of red-colored deposits which may be recent pyroclastics. To assess the long-term activity of the hot spots, we compare the SS1 and NIMS results with those from Voyager and from ground-based observations. The comparison yields the most complete picture so far of the distribution and persistency of hot spot activity on Io, which may lead to an understanding of the mechanisms driving Io's volcanoes and the degree of differentiation which must exist in Io's mantle.