

Galileo-NIMS observations of Io's surface

A.G. Davies, S. Doute and R. Lopes-Gautier
JPL-California Institute of Technology, USA

The Near Infrared Mapping Spectrometer (NIMS) on the Galileo spacecraft has been observing Io since June 1996. The goals of NIMS Io observations are to study the thermal emission from volcanoes and surface composition. NIMS has been very successful in detecting both new and previously observed volcanoes. Monitoring of the thermal emission from the volcanoes and combining NIMS data (in the range from 0.7 to 5.2 microns) with that from other instruments has allowed modelling and mapping of thermal emission. Close flybys of Io (Oct and Dec 1999 and Feb 2000) yielded high-resolution observations of a number of volcanic centers and surface regions. Compositionally, many hot spots are at temperatures concurrent with silicate volcanism. Some hot spots exhibit ultramafic liquidus temperatures. The variagated hues that give Io its colorful appearance suggest an abundance of sulfur-bearing compounds such as SO_2 , native and short chain sulfur, and sulfur oxides. However, none of these compounds have been clearly identified except SO_2 . Its presence as a solid frost on the surface is ubiquitous and its geographical distribution and physical characteristics have been mapped at different spatial scales. These SO_2 deposits behave as excellent tracers to study various phenomena (including plume activity, atmospheric circulation, and magnetospheric bombardment) which impact on the SO_2 cycle.