AOGS 2006

Cryovolcanic Features on Titan's Surface as Revealed by the Cassini Radar

ROSALY LOPES[1], KARL MITCHELL[1], ELLEN STOFAN[2], JONATHAN LUNINE[3], CASSINI RADAR TEAM[4]

[1] *Jet Propulsion Laboratory/Caltech*

[2] *Proxemy Research*

[3] *LPL, University of Arizona*

[4] *various*

The Cassini RADAR instrument has obtained SAR images of Titan's surface that reveal remarkably diverse geology (Wall et al., this issue) including a variety of features thought to be cryovolcanic in nature. Cryovolcanism on Titan had been proposed long before Cassini. Titan is sufficiently large that, during accretion, much of the body may have melted. Its interior could still contain a substantial layer of water-ammonia liquid which may erupt on the surface. RADAR images have confirmed that cryovolcanism is an important geologic process on Titan and analysis of features interpreted as cryovolcanic are yielding clues to the emplacement and possible composition of cryomagmas. The features imaged by RADAR include Ganesa Macula, a possible cryovolcanic dome, extensive flows, some of which are seen to emanate from calderas, and a large number of small, radar-dark circular features that may be volcanic craters or pits. Preliminary analysis of the topography of one of the flows indicates that the flowing material had a high viscosity (in excess of 104 Pa s), higher than those of ammonia hydrates measured in the laboratory, perhaps suggesting slurries with high ice-crystal fractions, or the inclusion of methanol. Although RADAR data have established that cryovolcanism is one of the major geologic processes shaping Titan's surface, significantly greater coverage of the surface is needed in order to assess the global extent of cryovolcanism and its significance for resurfacing.