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

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The Cassini Titan Radar Mapper obtained Synthetic Aperture Radar images of about 1.1% of Titan's surface during the spacecraft's first targeted fly-by on October 26, 2004 (referred to as the Ta fly-by). These images revealed that Titan is very complex geologically (see Wall et al., this volume). In this paper we review the features interpreted to be cryovolcanic in origin. These include extensive flows, a dome-like construct, and craters that may be volcanic in origin. *Flows*: Numerous SAR-bright, lobate features that appear to be both sheet-like and digitate flows are seen in the Ta swath. These extend from tens of kilometers to over 200 km in length. Several flows are seen on a dome-like structure, and these appear associated with linear features that may be cryolava channels. *Craters:* No features that can be unambiguously identified as impact craters have been seen in the Ta swath. Two craters that show flows emanating from them are seen in the data. The irregular shape of these two craters and emerging unidirectional flows supports a volcanic origin. *Dome or shield:* A circular structure that may be a dome or shield is the most prominent geologic features in the Ta SAR swath (see Wall et al., this volume). This feature has morphological similarities to pancake domes on Venus: it is circular, radar-dark in the central part, and shows a central feature ($\sim$ 20 km in diameter) that appears to be a pit crater or caldera. However, the Titan feature is significantly larger ($\sim$180 km diameter) than the Venus domes (typically 20-30 km diameter) and so far there is no conclusive evidence that

the Titan feature has steeply-sloping sides.

The presence of cryovolcanic features on Titan has long been suggested, as Titan is sufficiently large that, during accretion, much of the body may have melted. Its interior may still contain a substantial layer of water-ammonia liquid that may erupt on the surface (e.g. Stevenson, D.J. 1992, ESA SP-338, 167-176) and cryovolcanism has been suggested as a way of replenishing methane to the atmosphere. Titan's substantial atmosphere will affect the style of volcanism on Titan, with effusive eruptions being more likely than explosive (See Lorenz 1996, Planet. Space Sci. 44, no.9, 1021-1028). The findings by the Cassini RADAR's first SAR swath indicate that effusive cryovolcanic features may be common on the surface. We will also discuss results relevant to cryovolcanism from the second SAR swath, to be acquired in February 2005.