Space Studies of the Earth-Moon System, Planets, and Small Bodies of the Solar System (B)
Active Satellites in the Outer Solar System: Enceladus, Titan, Io, etc. - Implications and Consequences (B03)

CASSINI ISS OBSERVATIONS OF TITAN'S SURFACE AND CHANGES IN ITS SOUTH-POLAR LAKES

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Cassini's Imaging Science Subsystem (ISS) has been returning images of Titan since early 2004, continuing through the 65 close Titan encounters that have been performed to date. These observations have been combined to produce a 938-nm albedo map of the surface with resolutions ranging from several kilometers to several hundred meters. The morphologies observed on Titan's surface reflect a wide variety of geological features [1]: roughly east-west streamlined shapes, suggestive of aeolian processes, consistent with Cassini RADAR observations of dunes at low latitudes [2]; narrow, curvilinear channels; dark lakes and seas at high latitudes [e.g., 3]; rare impact structures, further evidence for a geologically young surface; and possible tectonic and cryovolcanic structures. Changes have also been observed: a new large dark area appeared between July 2004 and June 2005 [3] and may have subsequently faded. Recent ISS observations of Ontario Lacus suggest that its shoreline may have receded as well [cf. 4]. Such changes are interpreted to be the result of precipitation and ponding of liquid methane and the subsequent infiltration into the subsurface or evaporation thereof [3]. No changes have been observed to date in the lakes and seas at high northern latitudes. We will present ISS' most recent map of Titan's surface, documenting changes that may have resulted from weather and seasonal changes and their implications for Titan's active methane cycle.

References: [1] Porco et al. (2005) Nature 434, 159-168. [2] Lorenz et al. (2006) Science 312, 724-727. [3] Turtle et al. (2009) GRL 36, DOI 0.1029/2008GL036186. [4] Hayes et al. (2009) Eos Trans. AGU, 90, Abstract P54C-02.