Geophysical Research Abstracts,
Vol. 11, EGU2009-3297, 2009
EGU General Assembly 2009

Geology of Titan: latest results from Cassini RADAR data

R. Lopes and the Cassini RADAR Team

Jet Propulsion Laboratory, Division for Earth and Space Sciences, Pasadena, United States (rosaly.m.lopes@jpl.nasa.gov, 818 393 3218)

The Cassini RADAR has now imaged about 34% of Titan using its SAR mode. These data reveal that Titan's surface is geologically complex and has been modified by all the major geologic processes seen on Earth – volcanism, tectonism, impact cratering, and erosion and deposition by fluvial, mass wasting, and aeolian activity. Although some of these processes are very different from those on Earth (such as cryovolcanism vs silicate volcanism), the morphology of the landscape is remarkably Earth-like.We will discuss the geologic features revealed so far, particularly those in the most recent flybys. The surface is young – so far, only seven certain impact structures have been identified. Cryovolcanic structures are not ubiquitous on Titan, they are mostly manifested as flows, two of which appear to be associated with calderas. Fluvial flow deposits are also common, and we discuss the different morphologies that can help us distinguish fluvial and cryovolcanic flows. Channels formed by fluvial activity are common at all latitudes. Channel networks are often well-developed implying a long history of erosion. Lakes and seas (maria) of liquid hydrocarbons are mostly located at high northern latitudes, with very few being present in the south polar regions. Tectonic activity is seen in the form of mountain chains, mostly of low relief (under 2 km). "Sand seas" formed by dunes cover vast areas at low latitudes. The orientation of dunes reflects modeled atmospheric circulation patterns, but is affected by topographic obstacles. We have examined temporal relationships between units wherever possible, and concluded that aeolian and fluvial/pluvial/lacustrine processes are the most recent, while tectonic processes that led to the formation of mountains and Xanadu are likely the most ancient.