

Author: Jeffrey M. Moore, NASA
jeff.moore@nasa.gov

Titan Polar Landscape Evolution

With the ongoing Cassini-era observations and studies of Titan it is clear that the intensity and distribution of surface processes (particularly fluvial erosion by methane and Aeolian transport) has changed through time. Currently however, alternate hypotheses substantially differ among specific scenarios with respect to the effects of atmospheric evolution, seasonal changes, and endogenic processes. We have studied the evolution of Titan's polar region through a combination of analysis of imaging, elevation data, and geomorphic mapping, spatially explicit simulations of landform evolution, and quantitative comparison of the simulated landscapes with corresponding Titan morphology. We have quantitatively evaluated alternate scenarios for the landform evolution of Titan's polar terrain. The investigations have been guided by recent geomorphic mapping and topographic characterization of the polar regions that are used to frame hypotheses of process interactions, which have been evaluated using simulation modeling. Topographic information about Titan's polar region is based on SAR-Topography and altimetry archived on PDS, SAR-based stereo radar-grammetry, radar-sounding lake depth measurements, and superposition relationships between geomorphologic map units, which we will use to create a generalized topographic map.