A Large, Tectonic Complex in Titan's Southern Hemisphere—Impact Spawned? R. H. Brown[1], J. W. Barnes[2], C. Sotin[3], R. Jaumann[4], L. A. Soderblom[5], B. J. Buratti[6], R. N. Clark[7], K. H. Baines[6], P. D. Nicholson[8], and S. Lemoulic[3], [1]University of Arizona, Tucson, AZ, [2]NASA Ames Research Center, Moffett Field, CA, [3]University of Nantes, Nantes, FR, [4]DLR, Berlin, DE, [5]USGS, Flagstaff, AZ, [6]Jet Propulsion, Lab, Pasadena, CA, [7]USGS, Denver, CO, [8]Cornell University, Ithaca, NY.

Recent data obtained during Cassini's T17 and T20 flybys of Titan reveal a large complex of arcuate, subparallel mountains (see insets in Figs. 1and 2) existing from 30˚-60˚ south and 0˚-60˚ east [1]. These ranges transect the southwest section of a ~300-km diameter, semi-circular feature centered near 0˚, 0˚. It has been proposed that the semi-circular feature is the remnant of a large impact early in Titan's history [2].

Brownish materials seen in 3-band VIMS composites of Titan are known to correlate with the dunes of organic material [3] first seen by the Radar instrument on Cassini [4] and later observed at equivalent spatial resolution in the infrared by the VIMS instrument [5]. This dune material tends to be concentrated in areas near Titan's equator that are thought to be lowlands. The brownish material interior to and surrounding the semi-circular feature in Fig. 1 could be extensive dunes trapped in topographically lower terrain, suggesting that the bright ring defining the margins of the semi-circular feature is topographically higher. In addition, the material interior to the semi-circular feature has lobate margins, further suggesting that it is dune material emplaced in topographic lows by the prevailing winds.

The northwest part of the semi-circular feature seems to be transected by a large, linear marking on Titan that is over a 1000 km long, is covered mostly with brownish material and forms the bottom portion of the feature on Titan loosely called the "H". We offer the hypothesis that this feature, the semi-circular feature and the mountain ranges to the southeast are causally related, and that the semi-circular feature is indeed the remnant of an old impact, post dated by tectonic activity that gave rise to both the mountain ranges to the southeast and the long, linear feature to the northwest (previously proposed to be tectonic in origin[6]).

References: [1] Sotin *et al.* 2007, **LPSC 38**. [2] R. M. Nelson (2004), *private communication.* [3] L. A. Soderblom *et al.* (2007), submitted to **PSS**. [4] R. D. Lorenz *et al.* (2006), *Science* **312,** 724-727. [5] Barnes *et al.* (2007), **LPSC** 38. [6] Clark *et al.* 2007, *in preparation.*

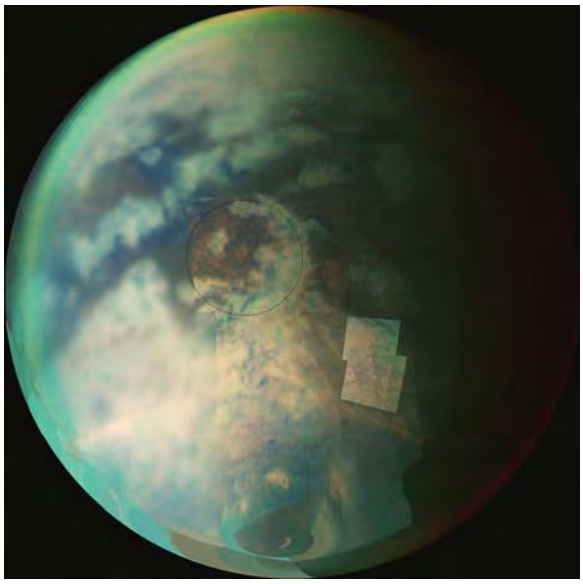

Figure 1: A composite of data from the T17 and T20 Cassini flybys of Titan. The inset is a 2-frame composite taken at ~ 6-km resolution during the T20 flyby. Sotin *et al,* (2007) estimate that the mountain range running roughly north-south in the center of the inset is ~150 km long, ~30 km wide and ~1.5 km high. Also shown is a circular outline meant to show the rough extent of the semi-circular feature to the northwest of the inset (see text) .

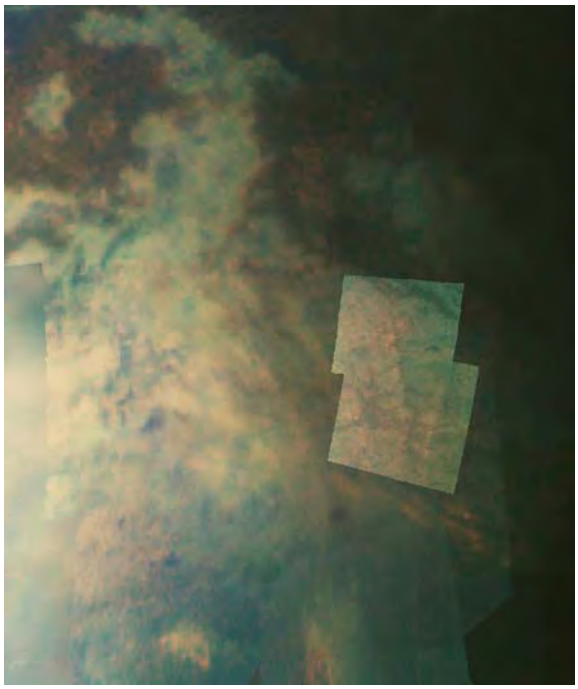

Figure 2: A blowup of Fig. 1