MORPHOTECTONIC ANALISYS OF MITHRIM MONTES, TITAN: PRELIMINARY RESULTS. D. Baioni[1] and M. Tramontana[1], [1]Planetary Geology Research Group, Dipartimento di Scienze Pure e Applicate Università degli Studi di Urbino "Carlo Bo", Campus Scientifico "E.Mattei" località Crocicchia, 61029 Urbino, Italy, davide.baioni@uniurb.it. .

Introduction: Mithrim Montes (Fig. 1), is located near Titan's equator, between 1,3° south and 126,8° west in the rugged region known as Xanadu, and in clumps called "ridge belts" located near the landing site of the European Space Agency's Huygens probe. It consists of three parallel ridges that are oriented east-west, spaced about 25 km apart, and are modeled as long-wavelength folds [1]. The highest peak is about 3,337 m high and is located on the southernmost of the ridges [2]. It is the highest known peak on Titan. We performed a detailed analysis of the radar image from NASA's Cassini spacecraft (the flyby called "T-43" by the Cassini team). An integrated analysis of morphographic and morphometric parameters of Mithrim Montes has been conducted focusing on the main geomorphic markers capable of supplying direct or indirect information regarding tectonic forcing on the topography.

Preliminary Results: Through our investigation we recognized few sets of lineaments (Fig. 2) that have been interpreted as possible faults. The main lineaments show WSW-ENE, NNW-SSE and NE-SW directions that range in length between 15 km to more than 90 km. The most important features are represented by lineaments extending in WSW-ENE direction that range in length between 40 and 80 km., while the longest feature is represented by a lineament in NNW-SSE direction extending for over 90 km. The WSW-ENE lineaments appear to control the ridges whose axis are displaced by the lineaments with NNW-SSE direction. Moreover, feature interpreted as triangular facets can be observed in the western part of the central ridge (Fig. 3). Here, two well defined triangular facets, with a broad base and an apex pointing upward, mark the northern side of the mountain front. A NE-SW lineament located at the base of the facets can be observed (Fig. 3).

Summary: Our study highlights that the processes that produced Mithrim Montes is endogenic, rather than exogenic. In fact, the observed features suggest a tectonic control on the surface topography due to deformation related to deep movement located below the icy crust. Thus they are formed by regional tectonic stresses as suggested by previous studies [3] instead of erosive processes of multi-ring basin-forming impact.

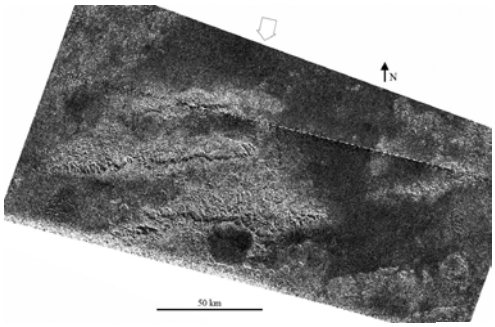

Figure 1: Image of Mithrim Montes seen by the Cassini spacecraft's radar instrument (PIA10654). Image credit NASA/JPL-Caltech/ASI.

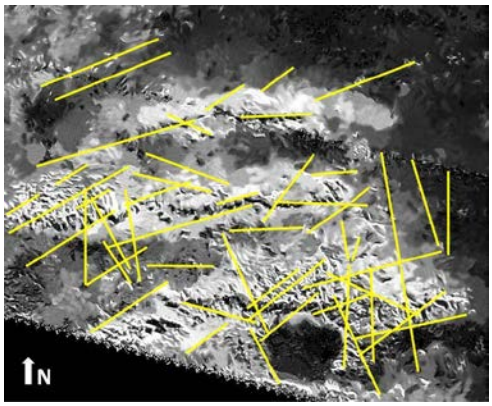

Figure 2: Image of Mithrim Montes (after despeckling processes) with the lineaments (yellow) observed. Image credit NASA/JPL-Caltech/ASI.

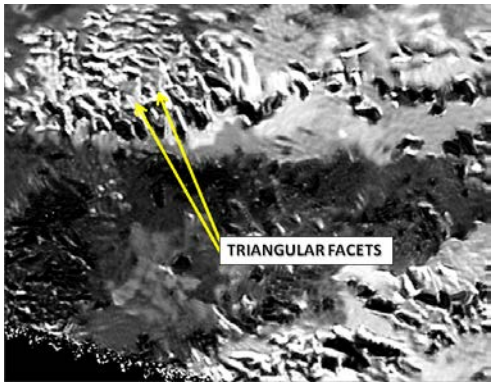

Figure 3: Triangular facets located in the central ridge. Image (modified credit NASA/JPL-Caltech/ASI.

References: [1] Mitri et al. (2010) JGR 115. [2] Radebaugh et al. (2016) *LPS XLVII*, Abstract #2694. [3] Liu et al. (2012) *LPS IVIII* Abstract#2378