TITLE: Properties of the Medussae Fossae Formation and its relation to the volcanic history of Mars

ABSTRACT BODY:

Abstract (2,250 Maximum Characters): Medussae Fossae (MFF) is a well known formation, stretching west of Tharsis volanoes. It is characterized as a relatively young Amazonian units (Amm, Amu), due to widespread signs of erosion. Earth based imaging radar observations at 3.5 cm [1] and 12 cm [2] have discovered a dark radar feature (Stealth), which roughly correlates with the MFF outline.

Recent investigations [3], suggested that the unit emplacement is in fact during Hesperian period, but it is composed of material that can be easily eroded. It is not clear when the erosion happened and if it is a continuing process. Hypotheses on MFF formation range from volcanic material emplacement (ash flow tuffs or pyroclastic materials) to an ice-rich dusty mantle, deposited during high obliquity.

In this work, we will present the latest observations of the East Medussae Fossae formation by the long wavelength MARSIS radar, continuing the work reported in [4], as well as complementing data surveyed by SHARAD data in [5]. The MARSIS radar has detected strong subsurface interfaces in the areas of Gordi and Eumenides Dorsae at depths up to 1.5km. We will present our analysis of the data, inferring the dielectric properties of the material to constrain properties of the material constituting the Medusae Fossae formation. We will also demonstrate an efficient user interface to work with MARSIS data inside a Geographical Information System (GIS).

The research leading to these results has received funding from the European Unions Seventh Framework Programme (FP7/2007-2013) under iMars grant agreement 607379.

[1] D. Muhleman, et al., “Radar images of mars,” Science, vol. 253, no. 5027, 1991.
[2] J. K. Harmon, et al., “Arecibo radar imagery of Mars: The major volcanic provinces,” Icarus, vol. 220, aug 2012.
[3] L. Kerber, et al., “The dispersal of pyroclasts from Apollinaris Patera, Mars: Implications for the origin of the Medusae Fossae Formation,” Icarus, vol. 216, nov 2011.
[4] T. R. Watters, et al., “Radar Sounding of the Medusae Fossae Formation Mars: Equatorial Ice or Dry, Low-Density Deposits?,” Science, vol. 318, nov 2007.
[5] L. M. Carter, et al., “Shallow radar (SHARAD) sounding observations of the Medusae Fossae Formation, Mars,” Icarus, vol. 199, pp. , feb 2009.

CURRENT * CATEGORY: Mars: Surface

CURRENT : None

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