MEASURING PLATY TEXTURES OF PUTATIVE MARTIAN FROZEN SEA AND/OR LAVA SURFACES USING THEMIS AND MOLA DATA. A.L. Fagan and S.E.H. Sakimoto, Department of Civil Engineering and Geosciences, University of Notre Dame, 156 Fitzpatrick Hall, Notre Dame, IN 46556-5637, E-mail: abacasto@nd.edu.

Introduction: Recent Mars Express High Resolution Stereo Camera (HRSC) images prompted suggestions that surface units with platy textures may indicate the presence of a frozen sea [1-4]. Other studies of the Martian topography and images have focused on these platy textures that are at scales as large as hundreds of meters to kilometers that may indicate a flow direction [4-8]. These platy textures have been interpreted as being resultant of lava-flows, mud-flows, or ice-flows [1-5]. By understanding their formation, we may be able to better understand the geologic history of the plains area of Mars.

Approach: We use the *JMARS* program [9] to search for platy surface textures in the vicinity of the Marte Valles region on Mars (Figure 1). We examine registered layered MOLA and THEMIS images of varying resolution dependent on the zoom of the image; *JMARS* image resolution varies from 1 pixel/degree to 8192 pixels/ degree. We explore both THEMIS day and THEMIS night images. Areas with the best MOLA and THEMIS data coverage and representative plate forms were saved and registered with high-resolution (256 pixels/degree or about 230 meters/pixel) MOLA topography grids from *Gridview* [10].

Discussion: From the several most promising study locations, we consider one particular site in detail for this preliminary report centered at 151.4 Easting, 6.7 Northing (Figure 1B). We find that the study plate lies in a fairly low relief area just south of a small massif of probably remnant highland materials with a gentle upwards slope to the SSE of approximately 0.0001 degrees. We also find that the trough immediately to the north of the plate margin (Figure 1B) varies in depth from approximately 1.5-1.7m deep, but can be as deep as nearly 5.5m on some areas. In addition, we find that the associated plate margin trough width is highly variable with values as small as 5.5km across for a nearby adjacent plate to as large as 153.78km across. The plate thickness in this region is approximately 1.5m thick, but has some areas where it is nearly 2m thick and others where it can be reasonably argued that MOLA data allows possible thicknesses of 0.5m. These thinner areas are isolated depressions in the plate. The plate has average roughness on a scale of less than one meter (approximately 0.25-0.75m), but has some areas with roughness as great as 1.3m and is thus comparable to measured plate thickness.

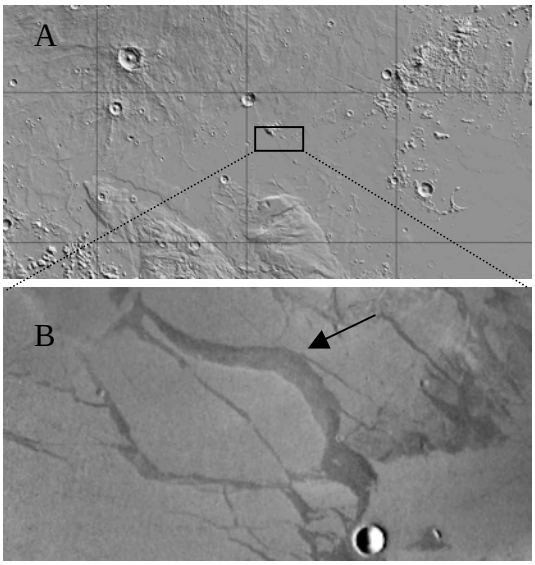

Figure 1: (A) 32 pix/deg MOLA image of broad study area, (B) 1024 pix/deg day-time THEMIS zoom of area in box in A; for scale, impact crater is approximately 4.8 km across. Arrow on figure indicates trough to the north of the plate margin discussed to the left.

Conclusions: This preliminary study suggests that, in at least one representative region, plate thicknesses and roughness values of 0.5-2m are seen where we have the best THEMIS and MOLA data coverage; these values are key constraints on modeling plate origins [11] to differentiate between plate formation by lava, ice, mud, or a combination of several processes. We will consider further regions as data availability and search processes allow.

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