Introduction

Arsia and Pavonis Montes are two of the three large shield volcanoes that comprise the Tharsis Montes on Mars. Detailed mapping of a limited area of these volcanoes using HRSC images (13-25 m/pixel) revealed a diverse distribution of volcanic landforms within the calderas, and along the flanks, rift aprons, and surrounding plains [1]. We are funded by NASA’s Mars Data Analysis Program to complete digital geologic maps of both Arsia and Pavonis Montes based on the mapping style defined by [1,2]. Here, we report on the progress from year 3 of the project [3].

Project Objectives:
1) Map Arsia and Pavonis at 1:1,000,000 map scale (1:2,000,000 to fit on the poster)
2) Show the areal extent, distribution, and stratigraphic relationships
3) Map the long lava flows along Arsia’s SW Rift Apron

Discussion

What are the relative geologic relationships of Pavonis NE rift apron?

Figure 3. Collapse features have coalesced to form a 25 km wide, fan-shaped amphitheater. The majority of the rift apron is covered by lava flows with no distinct margins. The younger flow fields are less dust cover, have channelized linear vents. However, the circumferential troughs at the base of the apron cut off the extent of the lava flows, indicating they are younger structural features. These troughs are partially buried by knobby material from the fan-shaped deposit. (Fig. 2) which means both the trouts and lava flows are pre-glacial. Detailed mapping of the high resolution CTX images (Fig. 3) allows the relative geologic history of these volcanoes to be reconstructed.

Mapping Units

Figure 4. A dome (1.5 km diameter & lobate feature (5 km) are mapped in the fan deposit. The dome crosses a 5 km long ridge that contains preserved cracks that appear to disrupt the surrounding unit. The morphologies indicate a volcanic dome & lava flow. The lack of burial by fan-deposit units and well-defined ridge cracks suggest it is a post-glacial eruption feature (<100 Ma) [4,5].

Figure 5. Examples of mapping units in the Fan Shaped Deposit on Pavonis Montes (based on units defined by [6]).

Figure 6. Example of mapping units defined in preliminary mapping by [12].

References: