



Morphometric analysis and cartographic representation of a volcanic field in Tempe Terra, Mars

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Viking Orbiter (VO) images revealed that the western Tempe Terra region (TT) on Mars (located in NE-Tharsis) displays various surface features indicative of basaltic volcanism. The morphologic evidence includes coalescing low shields, fissure vents, pit craters, steep cones, and lava flows. This assemblage of volcanic landforms is very similar to that of the Snake River Plains (Idaho; USA), where Greeley (1982) defined the term plains volcanism for a style of volcanism that is intermediate between Hawaiian shields and flood basalts. Recent studies began to incorporate accurate topographic data (MOLA) and high-resolution MOC images. A significant improvement in the available data base is now provided by HRSC data, which fully cover the region, THEMIS data, and the increasing number of extremely high-resolution CTX and HiRISE images. As suggested earlier by Plescia (1981), TT is widely covered by volcanic material. The extremely low flank slopes of the shield volcanoes suggest a very low viscosity of lavas. This could be a result of high eruption temperatures, high effusion rates, or a low Si- and a high Mg-content along with a possibly high Fe-content of the lavas. HRSC-based mapping shows an even denser pattern of vents, which are controlled by a pre-existing, NE-trending tectonic pattern, and coalescing shields than it was obvious in Viking-based mapping. However, many kipukas are present and low shields and associated lava plains become smaller and more isolated towards the SE. Both facts point towards a relatively small total thickness of the volcanic cover in TT, which might represent a thin late-stage veneer of basalt above much older and tectonically deformed basement. We show detailed topographic investigations and morpho-

metric analyses of low shields and present our GIS-mapping of volcanic landforms.