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The Medusae Fossae Formation (MFF): Marginal flow features and their implication for the origin of the MFF

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The HRSC on Mars Express has mapped a large contiguous region from about 1.5°N to 14°S and 175.5°E to 181°E in the western Lucus Planum. Among other features, the images cover Apollinaris Patera (AP) and the transition from the dichotomy to the Elysium Planitia (EP) with a spatial resolution from 12 to 45 m per pixel. A major part of this region is dominated by the western part of the Medusae Fossae Formation (MFF). In this region, the MFF shows distinct morphologic units which include (1) the "ridge and valley" region, (2) areas around AP mainly characterised by large yardangs, and (3) a large (approx. 50,000 km^2) and relatively flat NE-trending region with isolated hills. It is located between AP, the "ridge and valley" region and the EP. The area is strongly dissected by curvilinear fractures and depressions, which are often part of flow-like structures. Both convex and concave flow structures are observed. Several of these convex flows show an imbricated and platy surface texture and a fold-like character. Individual concave structures (e.g. in depressions) resemble plates and dessication cracks as observed in dried mud. The most prominent fold structures are found - and seem to originate - in areas with relatively high local relief, which is probably pre-depositional. In other areas with low local relief the direction and character of the flows vary over short distances. The overall style of the flow features indicates a high viscosity and at least for some of the features an almost solid state during deposition and/or deformation. The particular geomorphologic characteristics of this area might be an additional key to solve the question whether the MFF was formed by volcanic, aeolian or climate-controlled processes.