



Geomorphological characteristics of the interior layered deposits (ILDs) of Melas Chasma, central Valles Marineris, Mars

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Stretching almost 600 km in width, Melas Chasma is located in the central part of the Valles Marineris (VM) and is one of the lowest lying of the chasmata. Spectral mapping of this chasma, particularly using MEX's OMEGA instrument, has revealed a strong presence of water-altered minerals (roughly a quarter of all such detected minerals to date in the VM; Chojnacki & Hynek, 2008), in the form of monohydrated and polyhydrated sulphates.

Most of the sulphate-bearing rocks in Melas are found in association with thinly layered deposits, occurring in outcrops on the chasma floor. So-called interior layered deposits (ILDs) throughout the Valles Marineris have been the subject of considerable recent research, particularly for their association with these water-altered minerals. Better understanding of the origin and evolution of these ILDs may help to shed more light on the past climatic conditions on Mars and the potentially complicated history of liquid water on the planet.

Relatively little geomorphological study of the ILDs of Melas Chasma has been conducted to date with regard to the differing characteristics of the different sulphate-bearing rocks. For instance, areas corresponding to polyhydrated sulphates in the Melas ILDs show considerable different surface textures to those corresponding to monohydrated sulphates. Interestingly, the latter show some surface textures comparable to the wind eroded, yardang bearing surfaces of the Medusae Fossae Formation, located roughly 4000 km to the west on the opposite side of the Tharsis volcanic province.

This aim of this work, conducted as part of the European Research Council supported eMars project, is to compile a thorough geomorphological survey of the Melas Chasma ILDs and, through this, construct workable hypotheses regarding their origin and evolution and the context of their water-altered mineral content. Furthermore, to contrast and compare the ILDs of Melas with other large-scale deposits, such as the Medusae Fossae Formation and to collate evidence to support Melas Chasma's potential as a suitable landing site for any future martian rover/lander missions.