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Structural geometry of the interior layered deposits in the Valles Marineris, Mars, as measured in stero images of the High Resolution Stereo Camera (HRSC)

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Despite more than three decades of analysis, the origin of the Interior Layered Deposits (ILD) in the Valles Marineris (VM) trough system is still unknown. A variety of mechanisms has been proposed to explain their enigmatic occurrence: eolian, volcanic, and lacustrine processes. The structural geometry of layering, i.e. the strike and dip of layers, is an important parameter to constrain the processes responsible for depositing the layers. The measurement of layers on Mars has been problematic in the past due to the very limited availability of high-resolution accurate elevation data. We use recent topographic data from the HRSC camera onboard ESA‘s Mars Express mission to analyze the geometry of layering of several Interior Layered Deposits with the Orion structural analysis software. Strike and dip were measured in 50m/px gridded Digital Elevation Models and corresponding orthoimages. So far, we studies ILD‘s in Hebes, W Candor, Ophir, and NW Coprates Chasmata. We find that layers dip gently with generally less than 25°. The layers dip almost always in the downslope direction. So far, we do not find evidence for a lacustrine sedimentation of the layers. Instead, the downslope dipping of ILD layers is more likely to be in agreement with a draping process, e.g., pyroclastic fall deposits in a low-energy environment.