**INDICATORS FOR AN IMPACT DIRECTION IN THE CENTRAL PIT OF AN UNNAMED MARTIAN CRATER**.

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**Introduction:** The ejecta blanket is the most distinctive indicator for the impact direction in oblique impacts, showing the formation of "forbidden" zones and "butterfly" patterns [1,2]. The position of the central uplift relative to the crater center was proposed as another diagnostic feature [3], but could not be verified statistically [4] and might be caused by heterogeneous target structures [5]. A further promising indicator for obliquity is provided by the internal structure of central uplifts. Some terrestrial craters show a preferred stacking of layered bedrock in the central uplift [6,7] with bedding strike perpendicular to the long axis of the crater ellipse [7]. Further analysis of Martian craters [8,9] provide evidence that preferred strike orientation in the central uplift could be indicative for an impact direction. Here we present new results of the mapping of an unnamed central pit crater that confirm preferred strike orientation within central structures as a possible indicator for an impact direction.

**Methods:** An unnamed central pit crater south of Valles Marineris (15.8° S 63.7° W, 54.5 km crater rim diameter, 13 km pit diameter) was mapped with emphasis on structural trends of the exposed layered units in the central pit. We used high-resolution image data (HRSC, CTX, HiRISE) to determine the apparent strike values and additionally used an available HiRISE DTM of the western part of the central pit to get true strike and dip values using the Layertools extension for ArcGIS [10].

**Results:** The central pit crater can be characterized as an oblique impact crater using THEMIS infrared images showing a "forbidden" zone of the ejecta blanket which indicates an impact direction from 290-300°. Apparent and true strike orientation shows a very distinct preferred trend of 30-40° over the majority of the central pit. Strata predominantly dip WNW.

**Discussion:** An oblique impact and the impact direction from 290-300° could clearly be determined based on the ejecta pattern. The consistent 30-40° strike and westward dip of the analyzed stack of layers surrounding the central pit indicate material motion and shortening along 300-310° and a shear component top-to-the-SSE. This direction shows only a minute deviation from the impact direction inferred from the ejecta blanket. Shortening and stacking in the central crater floor is explained by the remnant horizontal momentum transferred from the impacting projectile to the target during the oblique impact [7]. The yet unsolved processes of central pit formation will also be considered and current models of pit formation will be cross-checked with the constraints given by the structural data gathered in this work. For instance, the orientation of central pit strata appear to be unaffected by the pit formation.

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