ANALYSIS OF DEFORMATION IN THE INTERIOR REGION OF ARTEMIS (VENUS, 34°S 132°E): PRELIMINARY RESULTS

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Artemis measures ~2600 km in diameter and is the largest known circular structure on a terrestrial planet. Artemis' most prominent feature is Artemis Chasma, a 1-2 km deep, ~2100 km diameter trough surrounding an interior topographic high. The surface of Venus abounds with circular to quasi-circular structures at a variety of scales including impact craters, coronae, volcanic rises, and crustal plateaus, however Artemis defies classification into any of these groups. Artemis dwarfs Venus' largest impact crater, 270 km diameter Mead . Topographically Artemis resembles some coronae, however Artemis is over an order of magnitude larger than the average coronae and more than twice the size of the next largest corona, Heng-O. Artemis' plan-form shape and size resembles volcanic rises and crustal plateaus, however domical volcanic rises and flat-topped steep-sided crustal plateaus differ greatly from Artemis topographically. Debate over Artemis' origin continues despite over a decade of research. Four hypotheses have been proposed. Artemis represents: A) a zone of NW directed convergence and subduction; B) the surface expression of a mantle plume; C) the surface expression of a bolide impact; or D) a composite structure with the interior representing a metamorphic core complex, marking exposure of a ductily deformed crust. These hypotheses make testable predictions for geologic relations in Artemis' interior. The subduction hypothesis requires a shallow subduction angle due to the curvature of Artemis Chasma, precluding volcanism after the initiation of subduction due to Venus' ultra-dry conditions. The plume hypothesis predicts temporally and spatially overlapping volcanic and tectonic evolution. The impact hypothesis calls for complete obliteration of preexisting structures, and interior structures recording post-impact response. The metamorphic core complex hypothesis predicts ~170 km of NW-SE directed crustal extension. Each of these hypotheses will be evaluated based on new high-resolution geologic mapping using full resolution (75 m/pixel) NASA *Magellan* SAR imagery, correlated altimetry data, and synthetic stereo SAR imagery, aimed at determining the geologic history of Artemis' vast interior region.