

VOLCANO-TECTONISM OF HELEN PLANITIA, VENUS. L. F. Bleamaster III, Planetary Science Institute, corporate address - 1700 E. Ft. Lowell Rd., Suite 106, Tucson, AZ 85719; mailing - 3635 Mill Meadow Dr., San Antonio, TX 78247; lbleamas@psi.edu.

Introduction: The Helen Planitia Regional Study Area (HPRSA, 0-57°S/180-300°E, I2477) covers over 70 million square kilometers (approximately 1/8th) of the surface of Venus, expresses 10 kilometers of relief from the highlands of Atla and Pheobe Regiones to the depths of Parga Chasma and vast Helen lowlands, and exposes areas representing the entirety of Venus' preserved geologic history as determined by Average Surface Model Ages (ASMA) [1 and 2]. Geologic mapping at 1:10M scale will afford the opportunity to place existing geologic interpretations: V39, V40, and V59 [3 - 5], and the diversity of other features into a coherent geologic history in order to help address the geodynamical and thermal evolution of the region across several physiographic provinces, a substantial number of which may be indicative of recent and/or present activity (three volcanic rises, two major chasmata, hundreds of coronae and paterae, and thousands of small volcanic constructs) [1, 6, and 7].

Beta-Atla-Themis: The northern portion of the HPRSA is dominated by the southern half of the Beta-Atla-Themis (BAT) region, a region thought to contain some of the youngest terrains on Venus. This area contains an anomalously high abundance of volcanic and tectonic features including: 23% of mid- to large-scale volcanic landforms [8]; 30% of Type I coronae, and 21% of Type II coronae [9], nearly two to three times the expected quantity if these features were evenly distributed across the planet, thus making the HPRSA a prime location for studying volcano-tectonic relationships.

Mapping: Current efforts are focused on mapping the distribution and orientation of structural trends and flow morphologies, and the demarcation of map unit boundaries based on primary and secondary surface morphologies. To date, several hundred radial and circular features (both digitate and lobate flow fields and fracture, fault, and ridge suites) have been documented and match closely the existing coronae and/or volcanic landform

databases [8 and 9]; however, not all correspond directly with defined Type I or Type II coronae, or other named volcanic landforms.

The majority of these radial/circular features lie within a few hundred kilometers of the Parga Chasma rift system, marking a southeast trending line of young volcano-tectonic activity. Although some very localized embayment and crosscutting relationships display clear relative age relations between centers of activity, the majority of Parga Chasma volcanism and tectonism overlaps in time from Alta Regio in the west to Themis Regio in the east, extending ~10,000 linear kilometers and crossing six 1:5M quadrangle boundaries (V38, 39, 40, 41, 52, and 53). Atla and Themis Regiones (rift-dominated and coronae-dominated volcanic rises, respectively [10]) lie in characteristically different ASMA regions (Atla-young; Themis-intermediate), but preliminary mapping has not revealed any significant 'stratigraphic' support for these age differences.

Coronae and chasmata: Efforts by Martin et al., [11 and 12] have comprehensively categorized the coronae within Parga Chasma and spatial analyses concluded no significant correlations between coronae type (annulus characteristics or topography) or size with respect to rifting. However, recent geophysical analysis by Dombard et al., [13] has identified four sites within the HPRSA that may represent contemporary activity, which correspond to the coronae: Maram, Atete, Kulimina, and Shiwanokia - all Type I coronae [9]. These potential sites of current activity fall directly under the main trend of Parga Chasma rifting, which may indicate youthful rifting in these specific locations as well. Each of the four corona share similar characteristics in plan form displaying: radiating flows in excess of several hundred kilometers, fractures and faults that trend parallel to Parga Chasma, and a developing steep concentric bounding scarp. Unfortunately these features are not 100% unique to these

four coronae, but they may speak to the youthfulness of these coronae, and nearby coronae, which may have been recently compensated.

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