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Introduction: Venustian coronae are circular to ovoid landforms with diameters up to thousands of kilometres. Coronae have annulus borders composed of densely packed grooves [1], graben potentially overlying dykes [2], mottled material and frequently lava flows that extend outwards from the annulus [3]. It has been proposed that the concentric geometry of coronae and their accompanying volcanic features support the interpretation that the coronae are the surficial expression of mantle diapirs [4]. The topographic expression of coronae may reflect different stages of corona evolution, specifically, elevated core regions are thought to represent retrogressive stage evolution while sunken core regions represent progressive stage evolution [5].

In the Henie (V-58) Quadrangle (Fig. 1) the Tellervo Chasma extends between the Latmikaik and Xcacau Coronae. This abstract examines the topography of these two coronae and the potential relationship between these coronae, related graben swarms, and the Tellervo Chasma.

Figure 1: Study Area. The Henie (V-58) Quadrangle is located in southern Venus. The yellow boxes mark the location of the Latmikaik Corona (L; Fig. 2) and the Xcacau Corona (X; Fig. 3).

Methodology: Geological features were traced in ArcGIS (at a scale of 1:500,000) on Magellan imagery downloaded from the Planetary Data System (PDS). Mapped geological features were categorized by defining characteristics such as orientation and trend.

Results: Latmikaik Corona (345 km x 650 km; Fig. 2) and Xcacau Corona (120 km x 165km; Fig. 3) are both elongated N-S and constrained by annulus material comprising dense swarms of radar bright, linear and curvilinear subparallel lineaments. Annulus material defines a topographic high around the edge of Latmikaik Corona with the core material slightly raised outlining an overall W-shaped topographic profile. Xcacau Corona has a less well-defined annulus and a sunken core. Tellervo Chasma extends between the two coronae (striking 050-230°). Six densely packed graben swarms (011-191°; 010-190°; 340-160°; 325-145°; 337-157°) cross Xcacau Corona and the northern end of Tellervo Chasma. One graben swarm (025-205°) extends the length of the chasma but does not appear to extend significantly past the margins of the chasma. One radiating graben swarm originates from an enigmatic feature at the southeastern corner of Xcacau Corona. Two further graben swarms (331-151°; 015-195°) were mapped south of Xcacau Corona. A further five graben swarms cut across the southern end of Latmikaik Corona (022-202°; 027-207°; 055-235°; 353-173°; 005-185°). One graben swarm (355-175°) veers west thirty degrees (325-145°) around the southwestern quadrant of Latmikaik Corona.

Discussion and Conclusions: The W-shaped profile of Latmikaik Corona suggests that this corona is in a retrogressive stage, while the sunken profile of Xcacau Corona suggests this corona is in a more progressive stage. The complex system of up to 14 swarms that cut across the coronae and Tellervo Chasma suggest a prolonged history of magmatism and extension, possibly related to the formation of these two coronae and more distal magmatic centers in response to underlying mantle plumes.

Future Work: Our team will complete mapping of the western half of the Henie Quadrangle in 2022 at a scale of 1:2,500,000. We intend to: i) Explore the relationships between Large Igneous Province plumbing systems (dyke swarms) and coronae, and ii) Examine the relationships between volcanic lava flows, coronae, chasma, shield volcanoes, dyke swarms and wrinkle ridges.
Figure 2: Geology of the Latmikaik Corona (there is no data for the western margin). Topographic profile (A), Magellan data (B, C), and mapped geology (C). This corona has a “W-shaped profile” suggestive of a retrogressive stage in corona development [5], with the elevated portions defined by the deeply grooved annulus (brown in Fig. 1C).

Figure 3: Geology of the Xcacau Corona and associated graben. Topographic profile (A), Magellan data (B, C), and mapped graben swarms (D). The Xcacau Corona has a sunken core which is interpreted to represent a progressive stage. The mapped grabens are interpreted to represent underlying dyke swarms whose orientations are described in the text. More detailed mapping is required to determine if the red graben swarm may belong to the pale blue or the darker blue graben swarm.

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