

WHAT IS THE EXTENT OF THE INFLUENCE OF THE ARTEMIS CORONA ACROSS THE HENIE (V-58) QUADRANGLE, SOUTHERN VENUS?

H.N. Bley¹, K.J.E. Boggs¹, R.E. Ernst^{2,3}, E.M. Bethell⁴, M. Becerra De Rosales¹, B. Beckie¹, M. Chowdhury¹, B. Dear¹, J. Demorcy², L. Dhami¹, R.C. Dietrich¹, J. Hall¹, W. Jans¹, C. Pendleton¹, J. Shackman¹, E. Varg¹, and H.G. Wehnes¹.

¹Department of Earth and Environmental Sciences, Mount Royal University, 4825 Mount Royal Gate se, Calgary, Alberta, Canada T3E 6K6;

²Department of Earth Sciences, Carleton University, 1125 Colonel By Drive, Ottawa, Ontario, Canada K1S 5B6;

³Faculty of Geology and Geography, Tomsk State University, 36 Lenin Avenue, Tomsk, Russia 634050;

⁴Department of Earth and Environmental Sciences, University of Ottawa, 75 Laurier Avenue E, Ottawa, Ontario, Canada K1N 6N5.

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Introduction: Artemis, a 2400 km diameter circular feature, is one of the largest tectono-magmatic features in our solar system, proposed to have formed above a deep mantle plume [1]. A concentric wrinkle ridge suite (13,000 km diameter) and a radiating dike swarm (12,000 km diameter) are proposed to belong to the Artemis system [1]. Venusian graben are long extensional lineaments generally appearing in linear, radial or circumferential patterns, and are widely interpreted to be the surface expression of underlying dike swarms such as those associated with Artemis Corona [2]. Wrinkle ridges are sinuous, elevated contractional features. The Henie (V-58) Quadrangle, directly south of the Artemis (V-48) Quadrangle (Fig. 1) - contains widespread north-south trending graben that could be related to Artemis. West-northwest to east-southeast oriented wrinkle ridges extend across much of the Henie Quadrangle. These wrinkle ridges could represent the southeastern portion of the Artemis wrinkle ridge swarm. Here we investigate the extent of the influence of the Artemis tectono-magmatic feature in order to assess the proposal by [1] that it is the largest in the solar system.

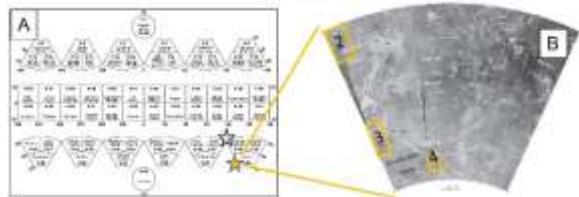


Figure 1: Study Area. The Henie (V-58; yellow star) Quadrangle is located in southern Venus, directly south of the Artemis feature (white star). The boxes outline the locations for Figures 2, 3 and 4.

Methodology: Files were downloaded from the Planetary Data System for Magellan data. Mapped topographical features were categorized by characterizing qualities such as orientation and trend.

Detailed mapping of Venusian geological features was conducted using ArcGIS at a scale of 1:500,000.

Results: The northwesternmost quadrant of the Henie Quadrangle (Fig. 2) is crosscut by three graben swarms (353-173°; 340-160°; 010-190°). In the region of Latmikaik Corona (Fig. 3) there is one north-south graben swarm (015 to 195°) and two more north-south graben swarms around the Gilliani Impact Crater (Fig. 4; 351-171°; 005-185°). Wrinkle ridges have inconsistent spacings across the western margin of the Henie Quadrangle being common in the northwest, minimal to non-existent around the Latmikaik Corona and then variably spaced around the Gilliani Impact Crater.

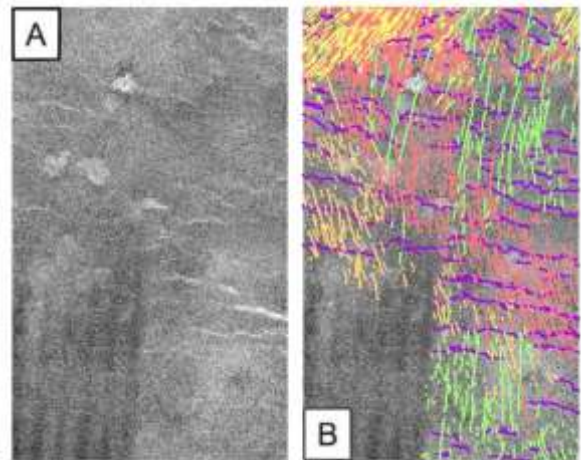


Figure 2: Northwestern quadrant of Henie quadrangle. This quadrant has three graben swarms (353-173°; 160-340°; 010-190°) traced in red, orange, and green respectively (Fig. 2.B) which align with graben in the Artemis system to the north. The purple wrinkle ridges (105-275°) are suggested to be part of the southeastern margin of the Artemis system. The fourth yellow graben swarm (045-225°) does not align with Artemis grabens.

Discussion and Conclusion: The five graben swarms that extend north-south from the northwestern quadrant of the Henie quadrant through Latmikaik Corona to Gilliani Impact Crater could possibly be grouped as a single N-S trending swarm across 2400 km of the Henie quadrangle. It is very challenging to connect the wrinkle ridges across the entire Henie quadrangle from the northwestern quadrant (Fig. 2) to the Gilliani Impact Crater (Fig. 4) because they are discontinuous.

Future Work: Our team intends to complete the entirety of the mapping for Henie (V-58) Quadrangle during 2022 at a scale of 1:2,500,000, while exploring the relationship between the Artemis feature, graben swarms and wrinkle ridges.

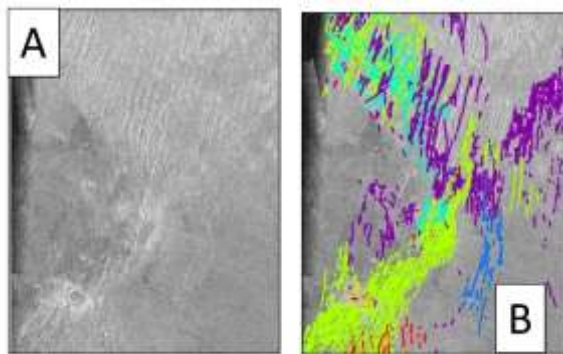
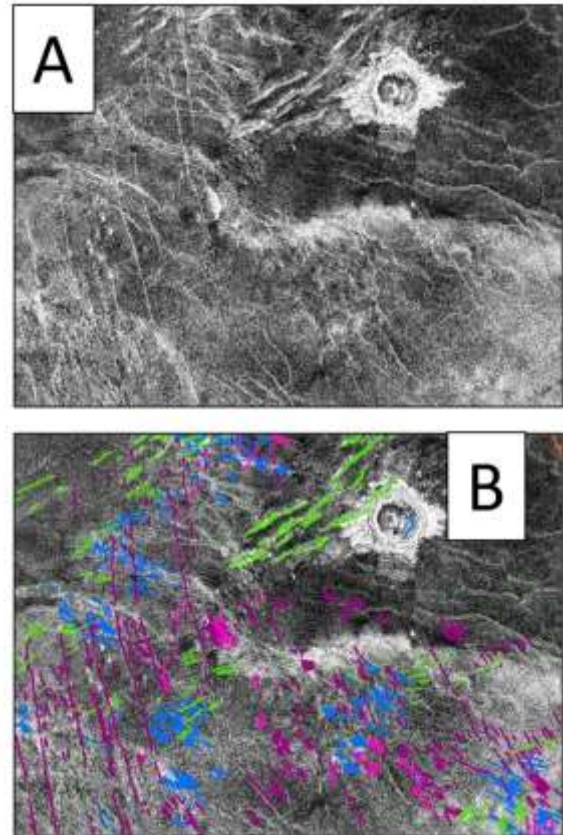


Figure 3: Southern portion of Latmikaik Corona. The purple graben swarm (015-195°) could be related to Artemis, but still need to be traced northward to Figure 2. Here, the orientation of the teal graben swarm appears to be controlled by Latmikaik Corona as they bend 25° to the west (355-175° to 318-138°) as they cross into the annulus. There are minimal to no wrinkle ridges visible in this quadrant.



015

Figure 4: Gilliani Impact Crater. Here the purple (351-171°) and pink (005-185°) graben swarms could be related to Artemis, but more work is needed to connect these graben with those in Figures 2 and 3. There is a patch of wrinkle ridges surrounding Gilliani Impact Crater (290-110°) which are unlikely to be associated with Artemis because the wrinkle ridges are not continuous across the Henie quadrangle. .

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References:

- [1] Hansen, V.L. and Olive, A. (2010) *Geology*, 38, 467-470. [2] Buchan K.L., Ernst R.E. (2021). *Gond. Res.*, 100, 25-43.