HENIE QUADRANGLE (V-58, SOUTHERN VENUS); LARGE IGNEOUS PROVINCE FEATURES.

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Introduction: The NASA Magellan Mission produced a valuable resource that planetary geologists continue to use three decades later to unravel the geological characteristics of Venusian Large Igneous Provinces. The ability to be the first to map the surface of Venus is a powerful engagement tool to inspire the next generation of planetary geologists, as illustrated by the size of the Mount Royal University (MRU) Venus geological mapping team (now 25, nearly ¼ of the MRU Geology Major program). Here we present an overview of the main geological features across the Henie Quadrangle (V58; Fig. 1; greater detail in [1, 2]) and highlight the work done by other members of our team [3, 4, 5, 6, 7]. We would appreciate your comments and feedback before we submit the first papers from the Mount Royal University (MRU) Venus geology mapping team.

Figure 1: Study area location and team projects A) Henie Quadrangle (V-58; blue star) is south of the Artemis Quadrangle (red star). B) The orange rectangles outline the locations mentioned (e.g. Fig. 2). The top left quadrant (#2) is directly south of the Artemis tectonomagmatic feature, which is perfectly situated to determine the extent of the influence of Artemis [1]. The Latmikaik Corona is being mapped by #4 [6], #5 [7], #6 [3], while #3 is examining the relationship between two coronae, two dorsa, a fluctus and at least five lava flows [4]. Canali extend across the entire quadrant [2], with mapping in #9 that revealed two generations of canali along with one canali segment originating from a circumferential graben associated with the Fotla Corona (Fig. 2).

Methodology and Team: MRU is an undergraduate university. We recruit students out of 1/2nd year courses, while giving them opportunities to publish a peer-reviewed journal article before graduation. In year one (Y1) the students learn how to use ArcGIS, how to identify and map the various Venusian geological features while completing the geological map of their quadrant (e.g. #s in Fig. 2), and unravelling the relative order of geological events. In Y2 or Y3, the students present a poster at either an internal MRU (e.g. [6], [7]) or an external conference (e.g. [10–5]). Bley [1] will likely submit her first paper before entering the Geology Major program.

Results/Discussion: Portions of quadrant maps are presented in Figure 2.

Figure 2 (above and next page): Results/Discussion from MRU geological mapping of the Henie Quadrangle (#s in white boxes correspond to the numbers in orange boxes in Fig. 1). We are exploring for evidence of strain localization into master faults as is typically observed on Earth (#4 [6] and #5 [7]). Detailed analysis of the Latmikaik Corona show no evidence for master faults with grooves evenly distributed
at 1.5 to 2.5km). In #8) there are seven lava flows with two populations of wrinkle ridges (WR) in bright green and bright red. The green WRs have been linked to the formation of the Artemis feature north of the Henie Quadrangle, while the source of the strain that formed the red WRs is unknown [5]. There is no evidence for master faults associated with WRs. There are at least two generations of canali (#9 [2]). The Rafara Fluctus (RF) flowed over canali segment H4b suggesting that H4b is older than RF. Canali segment Yc2 cut across RF, suggesting that Tc2 is younger than RF. Note that canali segment Yc1 originates from a Fotla Corona circumferential graben [2]. Detailed mapping of the Xcacau Corona (#3) revealed an ambiguous relationship between the Arubani Fluctus (pale grey) and the Sunna Dorsa (radar bright in top centre of figure). It is possible that the dorsa is the source of the lava for the fluctus, suggesting a fissure eruption to form this fluctus.

Future Work – Complete the Henie Quadrangle geological map.

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