CANALI MORPHOLOGIES, SOURCES AND RELATIONSHIPS WITH WRINKLE RIDGES, HENIE QUADRANGLE (V-58) SOUTHERN VENUS. J. Demorcy[1] K. Boggs[2], Ernst, R., H. El Bilali, Bethell, E. and Wehnes, H. [1]*Department of Earth and Environmental Sciences, Mount Royal University, 4825 Mount Royal Gate se, Calgary, Alberta, Canada T3E 6K6; Jerrydemorcy@cmail.carleton.ca*, [2]*Kboggs@mtroyal.ca*.

Introduction: Venus canali are present for 25% of the Venus surface and are mostly concentrated in lowland plain regions [1,2]. Canali features are usually 500-1000km long, and with a maximum of 7000km, and are simple channels with constant widths of 1-3km [3] along their length [3].

The great lengths and width size of Venusian canali, had led to the proposal that the lava that formed them would need to have a low viscosity such as tholeiite, basalt, high Fe-Ti basalt, komatiite, carbonatite, or sulfur-rich lavas [2,3].

The Henie (V-58) Quadrangle (Fig. 1) was chosen for our current mapping of canali because there are abundant lowland plain regions with canali segments that had not been mapped. These segments reveal interesting relationships between different generations of canali, Fotla Corona and its associated grabens, various fluctus, and wrinkle ridges. This research study aims to use detailed mapping at a scale of 1:500,000 to reveal new characteristics of these canali in Henie Quadrangle.

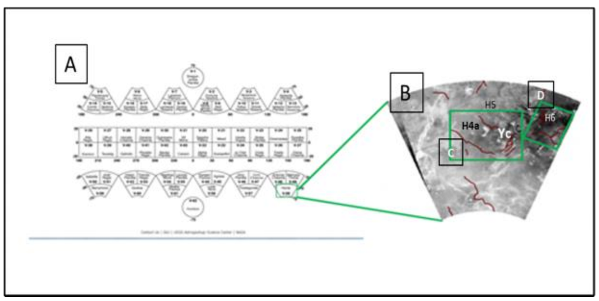

Figure 1: *Henie (V-58) Quadrangle is located in southern Venus (A). Green boxes C and D in "B" outline the regions detailed in the rest of the figures.*

Methods: Full resolution (up to 75m/pixel) right- and left-looking Synthetic Aperture Radar (SAR) images obtained by the Magellan spacecraft were downloaded from the Planetary Data System (PDS). The ArcGIS software suite was used was used to trace canali, wrinkle ridges, and corona structures.

Results: Twelve simple canali segments were mapped with lengths of 200-2500km and widths of 1.3-3.3km (Table 1). The north end of the NE-SW trending canali Yc1 ends at a graben attached to the south of Fotla Corona (Fig.2). The south end of canali Yc1 and Yc2 cuts across Rafara Fluctus. In some places, canali segments H6 were observed to follow the same path as wrinkle ridges, while cutting nearly perpendicular across wrinkle ridges in other locations (Fig. 3). Segment H4b cuts across wrinkle ridges and Nambubi Fluctus (Fig. 4), while Rafara Fluctus appears to have flowed across the southeastern end of this canali. Canali H4a has a topographic profile that outline valleys along their length (Fig. 4).

Table 1: Description of canali segments in Henie Quadrangle. [1]Measurements from [3]; CF = canali segments; width= average width; ts= tectonic structures; ds=dorsal; wr= wrinkle ridges; bf= bifurcation; RF=Rafara Fluctus; tt= tesserae terrain; rf=radiating graben fissures systems; dt= distinct termini.

CF	L (km)	W (km)	Comments
H1	1070	2.10	
H2	906	1.16	cuts ts and ds
H3	90	1.53	
H4a	742	1.20	1 bf
H4b	167	1.56	Older than RF
H5	331	1.53	
H5a	29	1.53	1 bf
H6	2257[1]	(0.3-1.8)[1]	3 bf and a system of canali. W side cuts by grabens. No dt.
H7	949[1]	(0.9-2.6)[1]	1 bf
H8	362		
H9	356		
H9a	64		1 bf
H10	203		cut across rf and ds
Yc1	~520	3.29	Starts from NNE-S trending graben cuts ts and RF
Yc2	235	3.50	cuts ts and RF

Discussion and Conclusions: *Possible source:* Elsewhere on Venus, canali have been proposed to flow out of corona features [4]. Here, it is possible that canali Yc1 flows out of the graben off the southeastern margin of the Fotla Corona because this canali terminates at this graben (Fig.2).

Two generations of canali: We propose that there are at least two generations of canali in the Henie Quadrangle. Segment Yc1 cuts across Rafara Fluctus while Rafara Fluctus appears to flow over segment H4b (Figs. 2, 4).

Age relationships between canali, corona, fluctus and wrinkle ridges: Wrinkle ridges cut across the Nambubi Fluctus supporting the interpretation that the Nambubi Fluctus is one of the oldest features in the study area (Fig. 4). Most canali segments in the Henie Quadrangle appear to have flowed along a few wrinkle ridges (Fig. 3) or cut nearly perpendicular to many other wrinkle ridges (Fig.3, 4); suggesting that these canali are younger than the wrinkle ridges when they follow along the wrinkle ridges, or older when they cut nearly perpendicular to the wrinkle ridges. Because the Rafara Fluctus flowed over the end of the canali segment H4b, while canali segment Yc1 cuts across this fluctus (Figs. 2,4); we suggest that segment H4b is older than the Rafara Fluctus while segment Yc1 is younger. Canali segment Yc1 could be one of the youngest features in the Henie Quadrangle.

Topographic influence on canali: Most lowland plain regions have considerable variation in topography [5]. A topographic profile along canali segment H4a (Fig. 4) rises 425m to the southeast and 325m to the northwest. It is very likely that this topography is the result of post-canali deformation [3, 6].

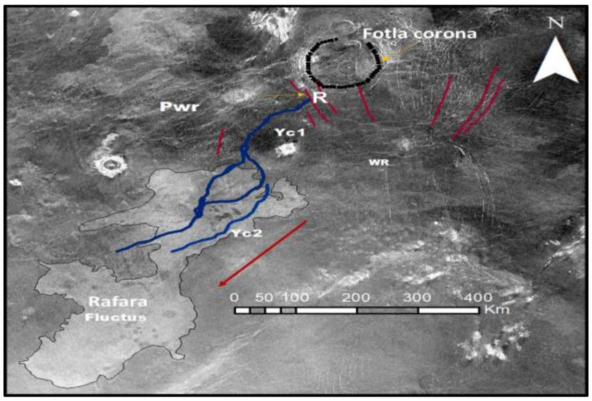

Figure 2. *Canali segments Yc1 and Yc2 cut across the Rafara Fluctus, suggesting that these canali are younger. Segment Yc1 ends at a graben south of Fotla Corona. Both the canali and the fluctus flowed towards the southeast (red arrow).*

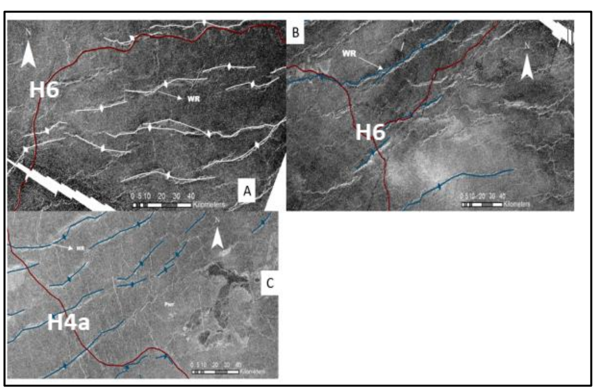

Figure 3. *Locations where the canali segments (red) flow along wrinkle ridges (WR; white/blue) shown with white arrows. This suggests that these canali segments are younger than the WR.*

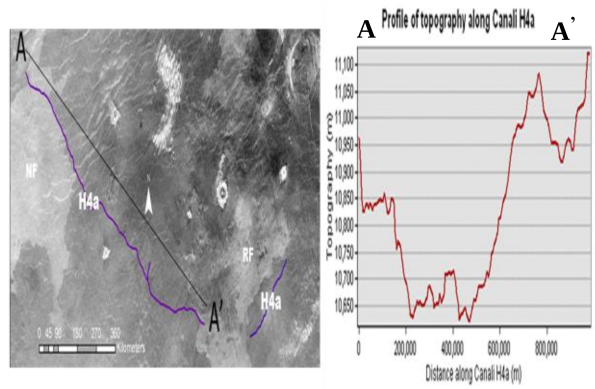

Figure 4. *Wrinkle ridges (WR), fluctus, topography and canali. Rafara Fluctus appears to have flowed over the southeastern end of canali segment H4a suggesting that the canali is older than Rafara Fluctus. In the west of this figure, WR cut across Nambubi Fluctus and the canali (H4a) cuts across the WR suggesting that this canali segment is younger than both the WR and Nambubi Fluctus. A-A' is a topographic profile along H4a with increases of elevation to the southeast of 425m and 325m to the northwest.*

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References:

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