DYKE AND CANALI HISTORY AROUND ITUANA CORONA, LLORONA PLANITIA, VENUS. K. Eloualda[1], H. El Bilali [2,3], R.E. Ernst [2,3], K.L. Buchan[4], N. Youbi[1]. [1] Department of Geology, Faculty of Sciences-Semlalia, Cadi Ayyad University, Marrakesh, Morocco; [2]Department of Earth Sciences, Carleton University, Ottawa, Ontario, Canada; [3]Faculty of Geology and Geography, Tomsk State University, Tomsk, Russia, [4]273 Fifth Ave., Ottawa, Canada.

Introduction: Ituana corona (centred at 19.5 N, 153.5 E) is a prominent feature in eastern Llorona Planitia, Venus, with a rim diameter of about 150-200 km. Extensive flows extend more than 700 km from the centre, and channelized flows are interpreted to radiate outward from the raised rim of the corona. Most of the features associated with Ituana corona are located in northwestern Quadrangle V-25 [1], but portions of it are also present in northeastern Quadrangle V-24 [2] and southwestern Quadrangle V-13 [3].

Research Goals: Previous mapping in Quadrangles V-25, V24, V-13) was at a scale 1:5,000,000 [1-3]. In this research we aim to produce a much more detailed map (1:500,000) of the graben-fissure systems and lava flows in order to develop a detailed geological history of this impressive corona.

Herein we report on graben-fissure mapping (which we interpret as overlying mafic dykes). A total of 11,276 graben-fissure lineaments have been mapped in the study area, and grouped into radiating, circumferential, and linear swarms.

Methods: Full resolution (up to 75 m/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 the graben-fissure systems and other features. Detailed linework is shown in Figure 1 and generalized in Figure 2.

Dyke Swarms: Graben interpreted to overlie dykes define two circumferential and a radiating system (Figs. 1, 2). In addition, two major linear trends have been identified in the area, NE and SW (Figs. 1,2)

Ituana Circumferential Swarm(s): Circumferential graben are associated with Ituana corona's raised rim and with a broad area west of the corona rim. In detail, the graben define two overlapping circumferential dyke swarms, a smaller eastern (reddish-brown) swarm, and a larger western (red) swarm that extends west of the raised corona rim (Fig. 2; enlarged in Fig. 3). The centres of the circumferential swarms are located ~65 km apart. Extensive flooding by lavas appears to have obscured parts of the circumferential systems.

Ituana Radiating Swarm: A graben-fissure system (light blue) radiates from the southwestern edge of the western circumferential swarm, extending out about 300 km from the centre (Figs. 2,3). It is very sparse on the northern and eastern side, perhaps because of the extensive distribution of late lava flows. In addition, there is a localized, radiating wrinkle ridge system on the west side (dark blue lines) of the corona.

Linear NE-Trending Swarm: An extensive NE-trending graben-fissure set (greenish-blue) extends across much of the map area (Fig. 2), and likely link to a magmatic centre (as yet unidentified) outside the map area. The swarm is especially dense on Oya-Dorsa ridge system.

Linear NW-Trending swarm: An extensive NW-trending graben-fissure set (black) extends across the map area (Fig. 2), and likely link to a magmatic centre (as yet unidentified) outside the map area.

Channelized flows associated with Ituana corona: We have mapped in detail channelized flows [4], which radiate away from Ituana corona (Fig. 3; see discussion in [1]). In general, the flows run downslope away from the corona rim. There is a spatial relationship between the channelized flows and the circumferential graben swarm on the NW side of Ituana corona and possibly on the SE side. This suggests that these channelized flows may be fed from the circumferential graben overlying dykes. Lava flows from circumferential graben of coronae have been reported in other studies [e.g., 5].

Canali: Long canali channels [4] that have been reported in earlier studies (e.g., [1]) occur in several parts of the study area. They are mapped (in purple) in Figure 2, and include Martuv, Jutrzenka, Ikhwesi, and Tai-pe canali.

Ituana Lava Flows: Extensive flows radiate in all directions from the centre of Ituana corona. We are currently mapping these in detail (1:500,000) in order to determine their sources, their relationship with the channelized flows, and their relationship to cycles of filling and emptying of the central corona depression.

Shield volcanoes: There is a concentration of shield volcanoes (yellow dots) within and in the vicinity of Ituana corona (Figs. 2,3). They are also abundant to the west and east of the corona (see also [1]).

References: [1] Young, D.A., Hansen, V.L. (2003) USGS Geol. Invest. Series I–2783. [2] Ivanov, M.A., Head, J.W. (2005) USGS Sci. Invest. Map 2870 with pamphlet. [3] Lang, N.P., Hansen, V.L. (2010). USGS Sci. Invest. Map 3089 with pamphlet. [4] Baker V. R. et al. (2015)

Geomorphology (Amst)., 245, 149-182. [5]Sanchez J.C. et al (2020) LPSC 52, 2548.

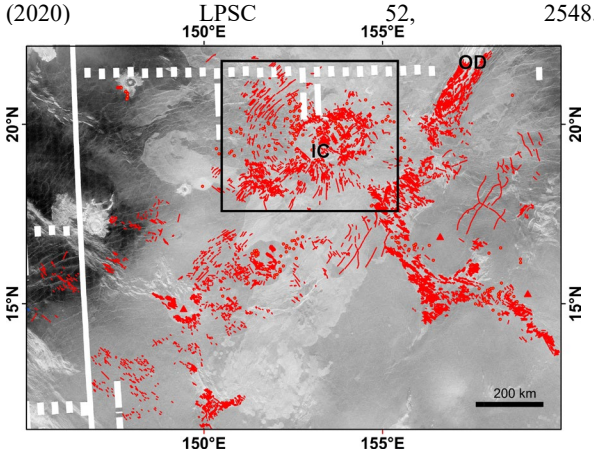

Figure 1: *Study area with detailed mapping of graben-fissure systems (11,276 graben-fissure lineaments mapped). Box locates Fig. 3. IC = centre of Ituana corona. OD – Oya Dorsa.*

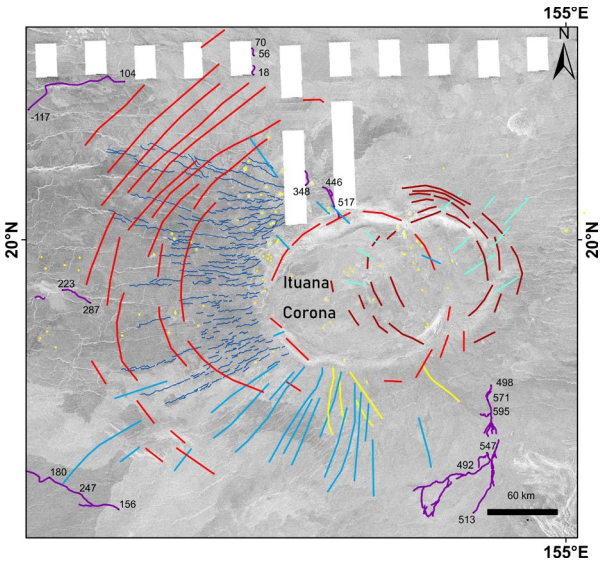

Figure 3. *Enlargement of the Ituana corona area, showing generalized graben-fissure systems (dyke swarms). Fanning dark blue lineaments are wrinkle ridges. Numbers are elevations along channelized flows.*

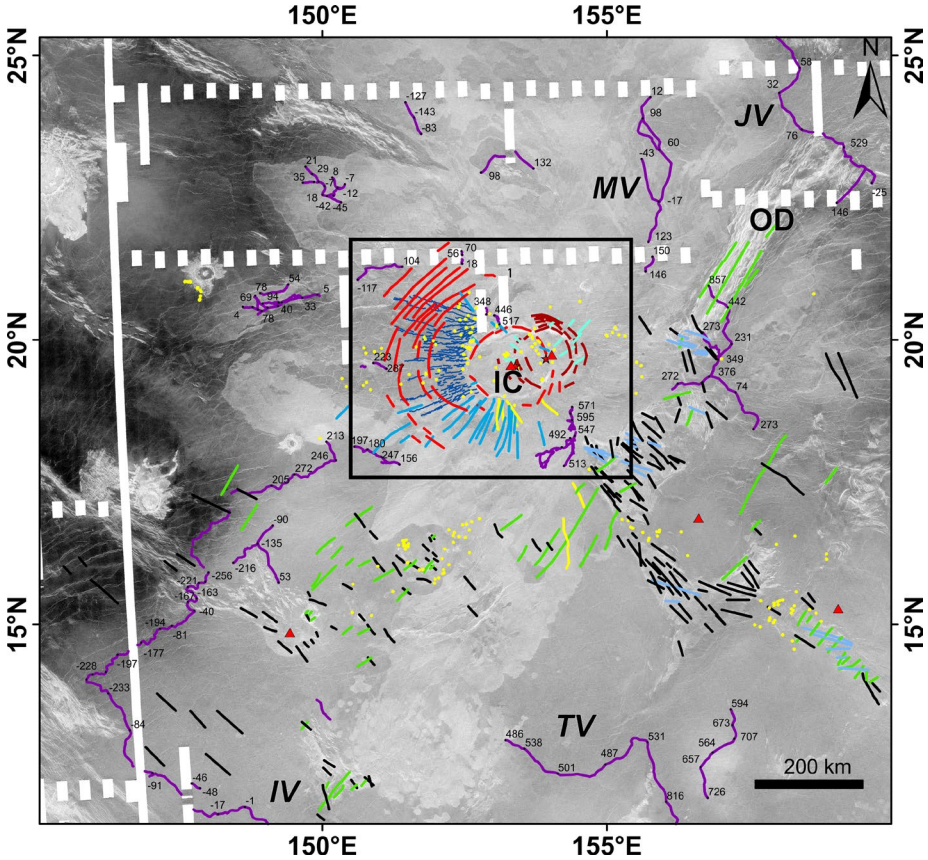

Figure 2. *Generalized linework with different colours for different inferred dyke swarms. Fanning distribution of wrinkle ridges (dark blue) is located west of IC. Channelized flows and canali are in purple, and numbers give elevations at points along these features. Canali are labelled: MV = Martuv, JV = Jutrzenka, IV = Ikhwesi, and TV = Tai-pe. Other labels: IC = Ituana corona, and OD = Oya Dorsa. Box shows location of Figure 3.*