QUETZALPETLATL AND INTERIOR BOALA CORONAE IN LADA TERRA RISE ON VENUS: GRABEN-FISSURE SYSTEMS (DYKE SWARMS) AND CHANNELIZED FLOWS. M. Ben Marzoug[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, marzoug375@gmail.com, [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, Ontario.

Introduction: Lada Terra rise, is a 2000-km-wide circular topographic feature that is elevated 2.5–3 km above the mean planetary radius in the southern hemisphere of Venus [7]. It is the site of numerous coronae including one of the largest on Venus, Quetzalpetlatl Corona (Fig. 1) [1]. Quetzalpetlatl Corona is 850 km in diameter, and hosts an interior corona, Boala Corona (350 km x 250 km in diameter).

Previous studies of the Quetzalpetlatl Corona area include reconnaissance-scale mapping (1:5,000,000 scale) of Mylitta Fluctus Quadrangle (V–61) [8], and the study of Ivanov and Head (2010). The latter provided an overview of the geological units and general characteristics of the Quetzalpetlatl Corona area in order to understand the origin and nature of the Lada Terra rise, which the authors concluded represented a long-lived mantle upwelling, that was also associated with recent volcanic activity on Venus.

Channelized flows (including canali, sinuous rilles and valley networks) are common on Venus [9], and exhibit a wide variety of morphological characteristics [10]. Simple channels generally consist of a single, sinuous main channel, whereas complex channels display branching, anastomosing, braided, or distributary patterns [10, 11].

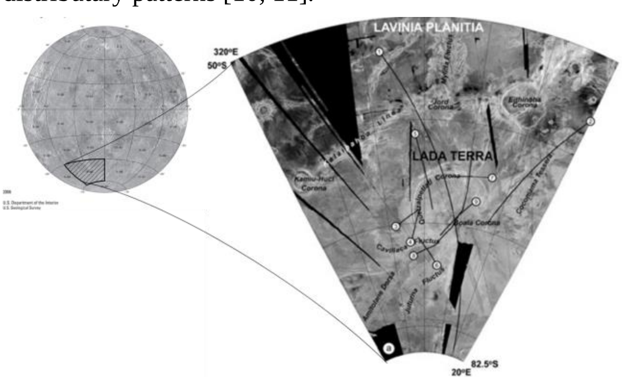

Figure 1. *Location of study area.*

Goals: Our broad research goal is to map Quetzalpetlatl Corona, both its graben-fissure systems (interpreted to overlie dyke swarms) and lava flows at 1:500,000, and to characterize its detailed geological history**.** In this abstract we present on two aspects:

1) Preliminary characterization of the dyke swarms of Quetzlpetlatl and its interior Boala Corona.

2) Mapping the channelized flow systems (cf. [9] that are spatially associated with Boala Corona and assess their relationship with the corona.

Methods: Geological mapping was carried out using full-resolution (75 m/pixel) Magellan SAR images (Left and Right look) and its altimetry data in ArcGIS Pro v. 2.8.

Dyke Swarms: More than 9500 graben-fissure lineaments have been mapped and grouped into radiating and circumferential systems (Fig. 2). An impressive radiating system is centred on Quetzalpetlatl Corona. It can be divided into 4 subswarms, each focused on a slightly distinct sub-centre within Quetzalpetlatl (Fig. 2b). In addition, a radiating system is centred on Boala Corona (Fig. 2b). Furthermore, graben-fissure systems circumscribe two of the radiating sub-centres, one belonging to Quetzlpetlatl Corona and the other to Boala Corona. The Boala Corona circumferential graben are clearly linked to underlying dykes, because they are observed to be the source of several channelized flows, as discussed below. To the east of Boala Corona, other small circumferential systems identify four additional centres (Fig. 2).

Channelized flows: We mapped approximately 15 channelized lava flows around the Boala Corona (Fig. 3). They typically trend downslope from sources in the outermost circumferential graben of the circumferential system, which is located along the elevated rim of Boala Corona. Based on altimetry data, the elevation of the sources range from 2158 to 2649 m (Fig. 3). The flows vary in length from 50 to at least 200 km. In some cases, flows begin within a circumferential graben, but then become channelized for a time along a radiating graben (and possibly even a second circumferential graben) before spilling out along a more irregular channel (e.g., Fig. 3B). Several channels branch in the downslope direction, or occasionally upslope. Oblique views of the Boala Corona topography and associated channelized flows are shown in Figure 4.

Acknowledgments: Magellan SAR images obtained from https://astrogeology.usgs.gov/search/?pmi-target=venus based on the data from https://pdsimaging.jpl.nasa.gov/volumes/magellan.html#mgnFMAP.

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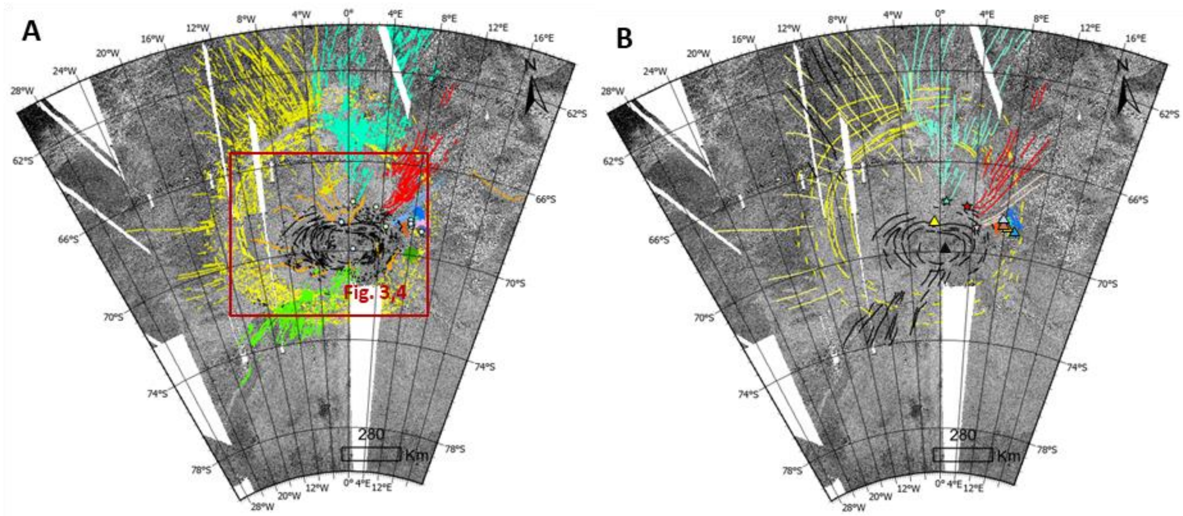

Figure 2. *Distribution of graben colour-coded by swarm. A) detailed lines. B) Generalized lines with different colours for each centre and associated dyke swarm.*

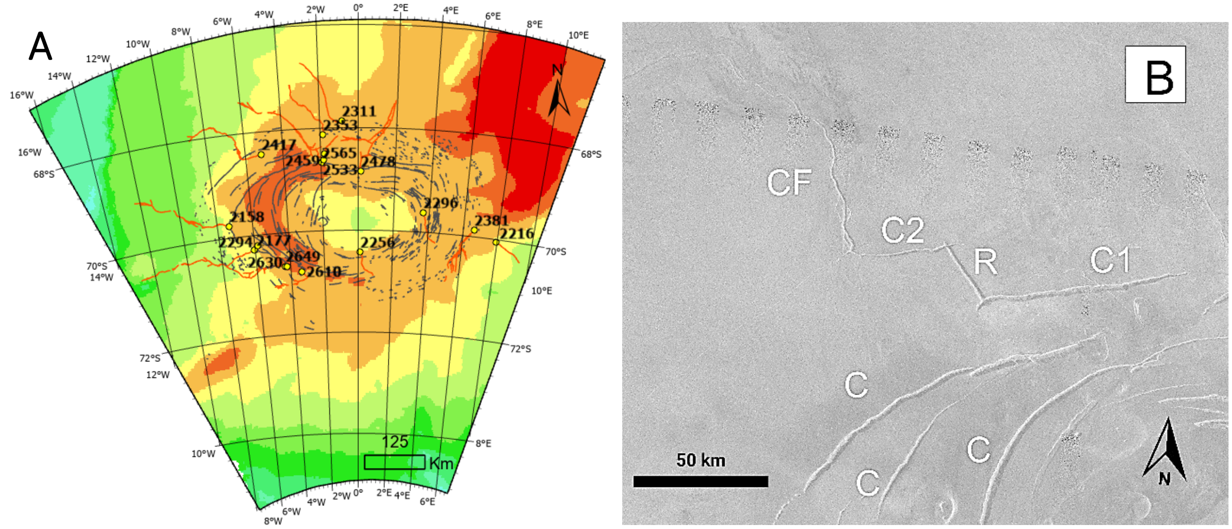

Figure 3. *A) Distribution of channelized lavas (red lines) on Magellan topography. Yellow dots locate sources. Numbers indicate elevations (in metres) of sources. B) Magellan SAR image showing channelized flow starting at a circumferential graben (C1), but following a radiating graben (R) downslope before following another possible circumferential graben (C2) and then continuing downslope to the NNW as a channelized flow (CF). The location of the centre of the image is 68.55 deg S, 354.51 deg E.*

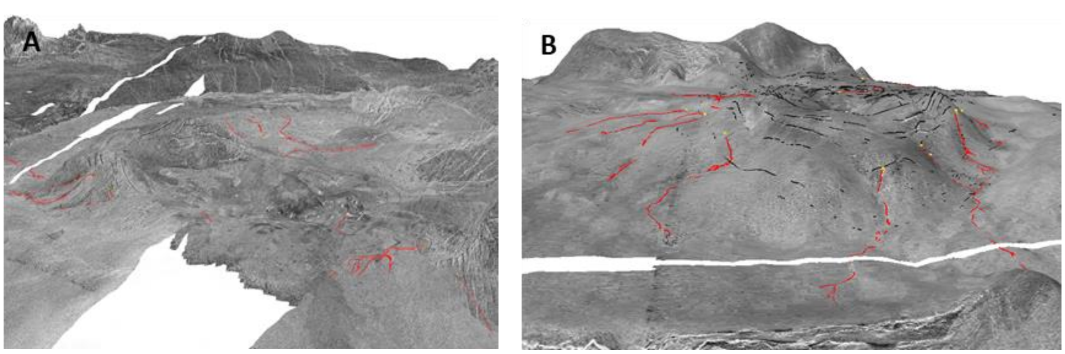

Figure 4. *Oblique view images of study area with topography generated using ArcScene. Red lies represent channelized flows. A) View to the NW. B) View to the SE.*