DYKE SWARM HISTORY OF BELET-ILI AND GAYA CORONA REGION, CENTRAL EISTLA REGIO, VENUS. Twinkle Chaddha[1], R. E. Ernst[2,3], H. El Bilali[2,3], R. K. Srivastava[1]. [1]Department of Geology, Banaras Hindu University, Varanasi, India: twinkle20.chaddha@gmail.com, [2]Department of Earth Sciences, Carleton University, Ottawa, Canada. [3] Faculty of Geology and Geography, Tomsk State University, Tomsk, Russia.

Introduction: Belet-ili Corona (6.0°N, 20.0°E) and Gaya (Gaia) Coronae (3.5°N, 21.5°E) are located about 2000 km east of Gula Mons in the Central Eistla Regio [1], which is a part of Eistla Regio (Fig. 1), an important volcanic rise on Venus made up of three regional upwellings (topographic rises): Western Eistla, Central Eistla and Eastern Eistla; each of which is composed of a clustering of volcanoes and coronae [2]. Eistla Regio is dominated by enormous radar dark plains and large volcanic edifices such as Sif Mons, Gula Mons and Sappho [3].

Belet-ili and Gaya coronae lie within Sappho Patera Quadrangle (part of Eistla Regio) for which some previous mapping has been done on 1:5,000,000 scale [4].

Objectives: The broad goal of this research is detailed mapping at 1:500,000 (about 10x more than previous studies) of the lava flows and graben system (interpreted to mainly mark the surface expression of dyke swarms) in order to develop a detailed geological and tectonic history of this portion of Central Eistla Regio, and specifically of Belet-ili and Gaya coronae. This abstract presents initial results on interpreting the dyke swarm history from mapping of graben systems.

Methodology: Magellan SAR data are used for mapping the grabens using ArcMap 10.8.1 software. In addition, JMARS 5 [5] has been used to explore the broader area and construct topographic profiles.

Dyke Swarm History: More than 17,500 grabens have been mapped (Fig. 2) in and around the two coronae (13° and 26° E longitude and 0° and 10° N latitude) (Fig. 1). The trend of grabens includes the linear, radial and circumferential patterns (interpreted as dyke swarms) suggest at least 11 magmatic centres (Fig. 3). Two of the centres, i.e., Belet-ili and Gaya coronae, have been studied in the most detail.

Belet-ili Corona (Fig. 4)– The different units of the annulus together with the structural features form the very prominent circular structure seen in the image [1]. Five different dyke swarms have been distinguished within the corona (three radiating and two circumferential) along with their centres. In addition, two other swarms, trending NNE (light blue lines) and NNW (light green lines), are also identified, however their sources are yet to be identified.

The concentric dyke swarm associated with the centre C1 spans up to a diameter of about 360 km (dark blue lines, Fig. 4). A prominent radiating dyke swarm (yellow lines, Fig. 4) associated with the centre R1 has been identified, which shows swinging in the NE side of the corona at a distance of approximately 320 km; it possibly marks the edge of the plume head beneath [6]. The R3 centre has both a radiating swarm (purple lines, Fig. 4) and a circumferential dyke swarm (sand yellow lines). It is probably younger than the C1 centre as the dark blue circumferential dykes associated with C1 are concealed by the later flows from R3 centre in the NW portion of the corona. R2 centre shows a minor radiating dyke swarm (brown lines).

Gaya corona (Fig. 5)– It is an elliptical or subcircular-shaped corona approximately 400-600 km in diameter. Graben systems of varied trends are associated with this corona; possible sources of majority of these dykes have been distinguished as shown in the Fig. 5. The giant circumferential dyke swarm associated with C'1 centre extends up to a diameter of approximately 440 km. Also, a less prominent radiating swarm is associated with this centre (black lines). Two major radiating swarms, i.e., R'1 (orange lines) and R'2 (light yellow lines), associated with this corona have been distinguished. A few radiating dykes associated with R'2 centre can also be recognized outside the edge of the corona on the southeastern side.

Also, two major swarms have been distinguished which have their sources located outside the study area. The light pink swarm shown in Fig. 3 has Changko Corona (10.9°N, 6.2°E) (Fig. 1) as its source is located 1030 km and the maroon swarm (Fig. 3) has Anala Mons (11°N, 14.4°E) (Fig. 1) as its source, 115 km, both located to the NW of the study area.

The next stage of the research will focus on the detailed mapping of flows and integrating with the identification of magmatic centres from the graben sets (dyke swarms), which will help in developing a comprehensive geological history of the area.

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

References: [1] Basilevsky, A. T., Head, J. W. (1997) *EMP, 76*: 67-115. [2] Ernst, R. E., Desnoyers, D. W. (2004) *PEPI, 146*, 195-229. [3] Senske, D. A., et al. (1992) *JGR: Planets, 97*, 13395-13420. [4] McGill, G. E. (2000). *USGS MAP I–2637*. [5] Christensen, P. R. et al. (2009) *AGU Fall Meeting*, *Abstract* #IN22A-06.[6] Buchan, K. L., Ernst, R. E. (2021) *Gond. Res., 100*, 25–43.

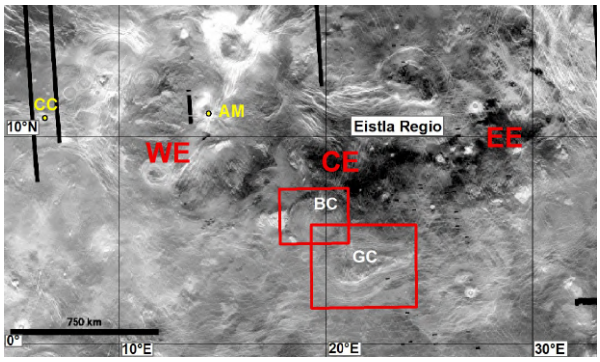

Figure 1 *– Eistla Regio with red boxes showing Belet-ili Corona (BC) and Gaya Corona (GC). Image from JMARS [5]. EE = Eastern Eistla, CE = Central Eistla, WE = Western Eistla, AM = Anala Mons, CC = Changko Corona.*

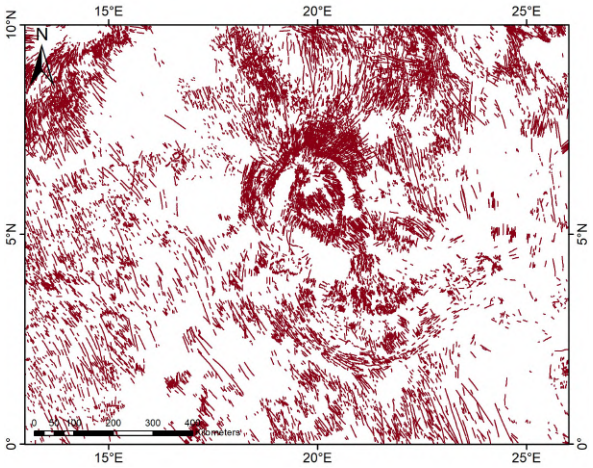

Figure 2 *– Geological map of the entire graben systems mapped.*

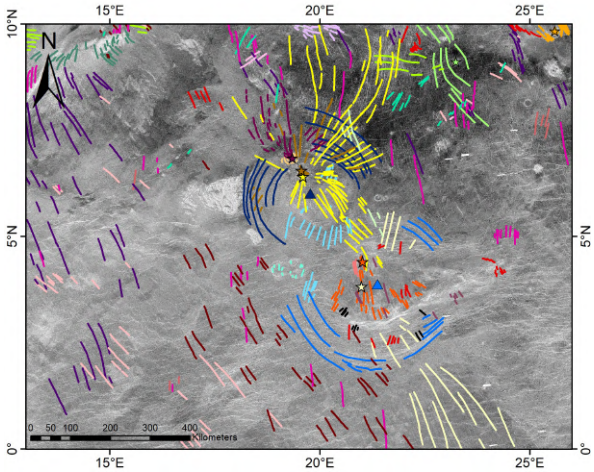

Figure 3 *– Geological map of the study area showing generalized graben-fissure systems. Colors represent different dyke swarms.*

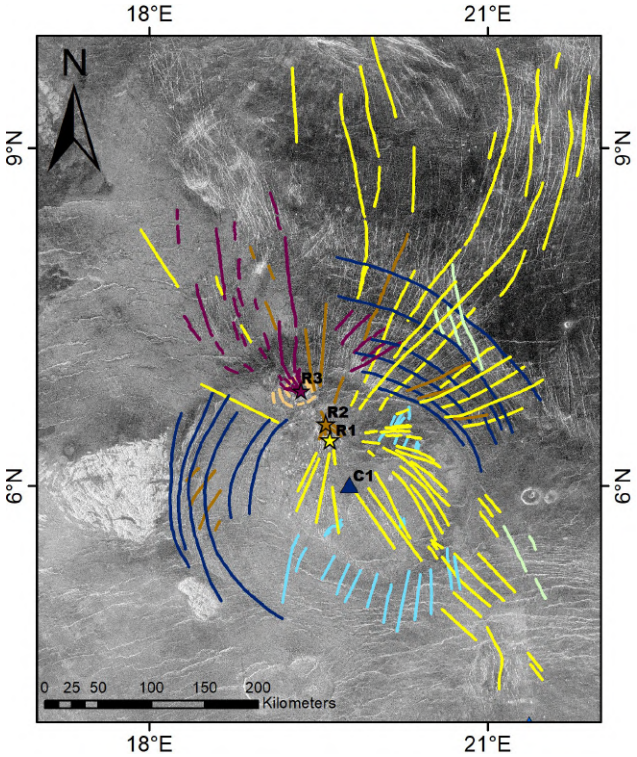

Figure 4 *– Enlarged geological map of Belet-ili Corona and associated dyke swarms along with their possible sources (marked by stars for radiating swarms and triangles for circumferential swarms).*

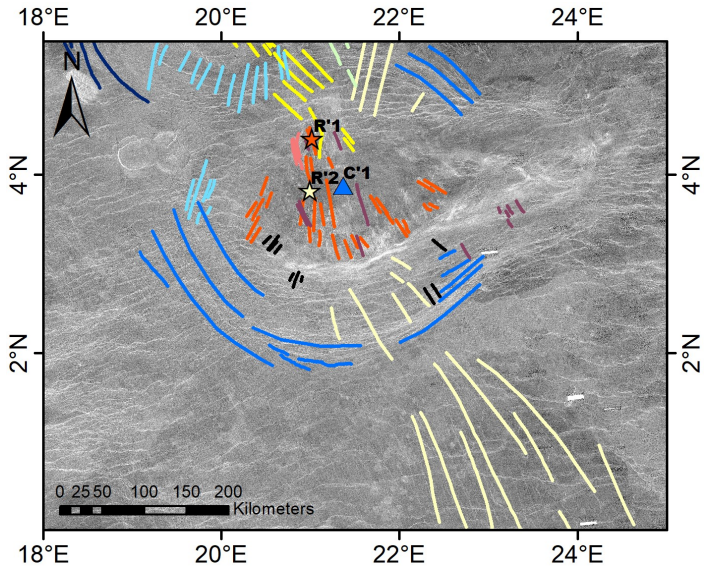

Figure 5 *– Enlarged geological map of Gaya Corona and associated dyke swarms along with their possible sources (marked by stars for radiating swarms and triangles for circumferential swarms).*