

GRABEN SYSTEMS (INTERPRETED AS DYKE SWARMS) OF SITH AND KHABUCHI CORONAE ALONG DALI CHASMA, SOUTHWEST OF ATLA REGIO, VENUS.

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Introduction: The Dali-Diana Chasmata (rift zone) trends SW from Atla Regio (Fig. 1). This region is part of Quadrangle V-37 which has been mapped at 1:5,000,000 scale [1]. The present detailed 1:500,000 scale study focuses on the magmatic component along Dali Chasma and specifically, the grabens associated with two important corona along Dali Chasma, Sith (Si) and Khabuchi (K) coronae (Fig. 2). This study builds on the previous mapping reported in [2]. Detailed mapping of the graben sets associated with corona in rift systems (in this case Khabuchi and Sith coronae) will further elucidate the nature of the frequent association of corona with rift systems [3-9].

On the basis of criteria discussed in [10, 11] we provisionally interpret these graben systems as the surface expression of dyke swarms

Graben-Fissure Lineaments (Dyke Swarms): Detailed mapping of graben (32,000 lineaments to date) reveals a complex distribution of radiating, linear and circumferential graben sets, distinguished by color (in Figs. 3-4). We distinguish 12 different swarms, that allow us to identify at least 6 magmatic centers (3 for Khabuchi corona and 2 for Sith corona and a final one for a previously unidentified center, as well as a circumferential system around Sith corona) (Fig. 3).

To improve the visualization of these distributions and relationships, we produced generalized distribution plot of graben sets (Fig. 4). Two radiating swarms (shades of green lines in Fig. 4) are centered on Khabuchi corona. Two radiating systems are associated with the Sith (shades of blue lines in Fig. 4), as well as the unnamed system in pink.

The Khabuchi radiating swarm (green) has a maximum radius >400 km and transitions from radiating to a more linear SSW trend after about 100 km. Such relationships indicate the transition from a central radial stress to the regional stress field, and may indicate the size of an underlying upwelling diapir (cf. [11]). Other graben sets associated with the Khabuchi center generally have trends suggesting links to multiple radiating centres within the corona (a feature that has been noted for other corona; [12])

For Sith corona, its radial system extends more than 500 km NE towards Atla Regio. A large circumferential system is identified around Sith corona.

Topography: Topographic profiles across Sith and Khabuchi coronae (Figs. 5 and 6) reveal a significant topographic rise for Khabuchi (rising 2000 m) but no significant topographic change across Sith corona (Figs. 5 and 6).

Acknowledgments: Magellan SAR images obtained from <https://astrogeology.usgs.gov/search/?pmi-target=venus>.

References: [1] Hansen, V.L., DeShon, H.R. (2002). USGS Geol. Invest. Series Map 2752. [2] Mediany et al. 2022, LPSC abstr. 1252. [3] Hamilton, V.E., Stofan, E.R. (1996) Icarus, 121, 171–194. [4] Martin, P., Stofan, E.R. (2004) 35th LPSC, Abstract no. 1576. [5] Martin, P., et al. (2007). JGR, 112, E04S03. [6] Smrekar, S.E., et al. (2010). JGR, 115, E07010. [7] Ivanov, M.A., Head, J.W. (2015) Planet. Space Sci., 113-114, 10-32. [8] Graff, J.R., et al. (2018) Icarus, 306, 122-138. [9] Guseva, E.N. (2019). Solar System Res., 53, 151-160. [10] Grosfils, E.B., Head, J.W. (1994) GRL, 21, 701–704. [11] Buchan, K.L., Ernst, R.E. (2021). Gond. Res., 100, 25–43. [12] Ernst, R.E. et al. (2003) Icarus, 164, 282–316. [13] Christensen, P. R. et al. (2009) AGU Fall Meeting, Abstract #IN22A-06

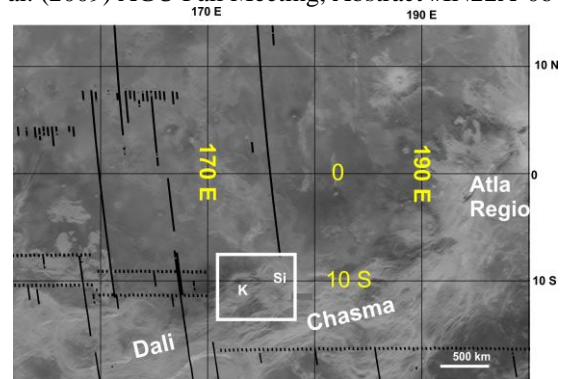


Figure 1. Location map for study area along Parga Chasma.

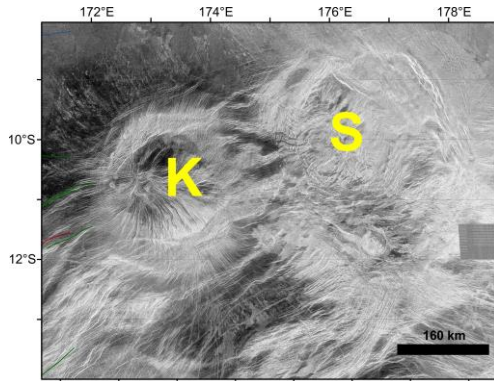


Figure 2. Magellan Left Look (Cycle 1) SAR image of study area. S = Sith and K = Khabuchi coronae.

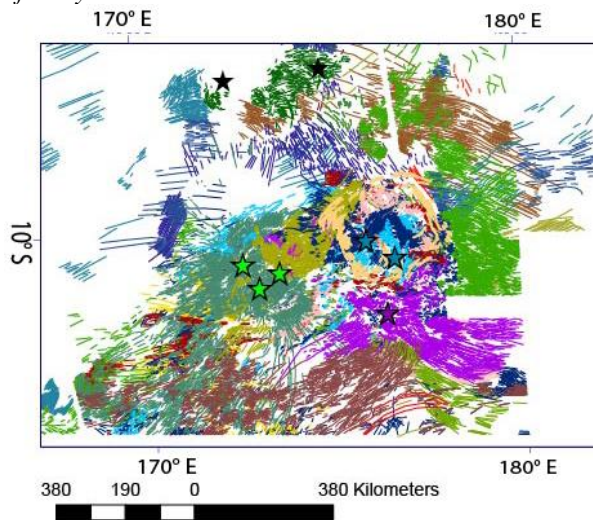


Figure 3. Detailed mapping of graben in study area and coding by colour into sets based on geometry: linear, radiating or circumferential.

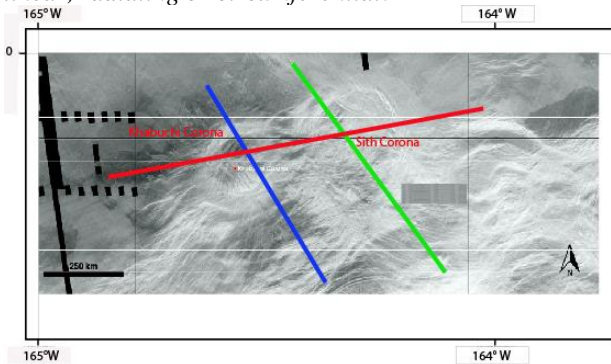


Figure 5: Location of topographic profiles shown in Fig. 6 across Khabuchi and Sith coronae. Background image from JMARS [13].

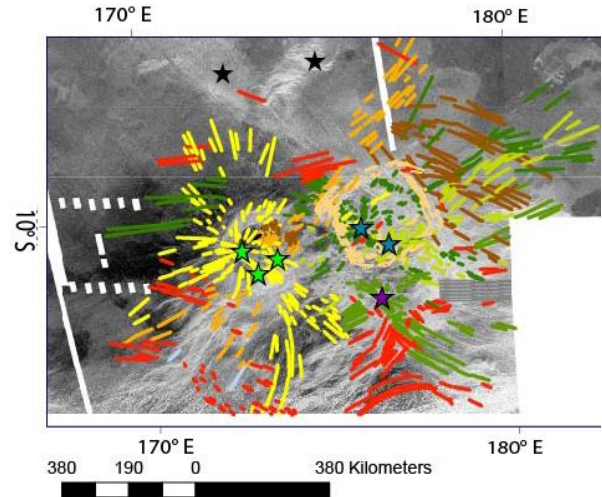


Figure 4. Generalized graben distributions distinguished by colour. Superimposed on Magellan SAR image.

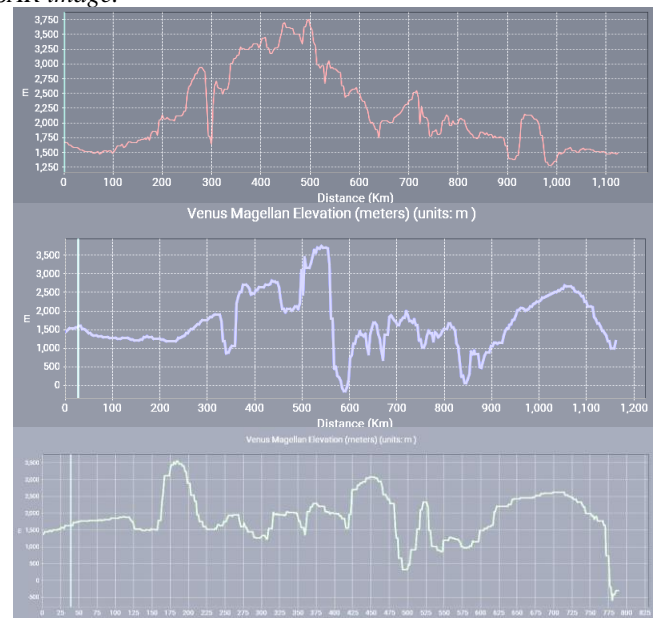


Figure 6: Topographic profiles across Khabuchi and Sith coronae.