

DEVELOPING A DYKE SWARM HISTORY FOR BELL REGIO, VENUS. M. Riaz¹, R.E. Ernst^{1,2}, H. El Bilali² ¹Carleton University, Ottawa, Ontario, Canada; MahanoorRiaz@cmail.carleton.ca; richard.ernst@ernstgeosciences.com; hafidaelbilali@cunet.carleton.ca, ²Faculty of Geology and Geography, Tomsk State University, Tomsk, Russia

Introduction: Bell Regio is a broad rise approximately 1500 km in diameter with several main volcanic centres, Tepev Mons, Nyx Mons, Nefertiti Mons and Otafuku Tholus (e.g. [1-3]).

The goal of our mapping is to provide a detailed dyke swarm history of Bell Regio. There are abundant graben fissures lineaments and pit chains [4] in Bell Regio (Fig.1) which can be grouped into distinct sets on the basis of their distribution and trends (Fig. 2). Such sets can be interpreted to mark the surface expression of radiating and circumferential dyke swarms [5] and which can be associated with known volcanic centres or unnamed cryptic centres within Bell Regio or potentially linked to more distal magmatic centres outside Bell Regio.

The full distribution of graben-fissure lineaments is shown in Figure 1 and they are grouped in Figure 2 into sets based on trend and geometry (radiating, circumferential and linear), and are interpreted to represent different dyke swarms. Our work reported herein is being extended across Bell Regio in order to develop the full dyke swarm history. In Nefertiti Corona radiating swarms define at least three centres (red stars in Fig. 3) and circumferential sets are also apparent. Tepev Mons has a clear circumferential swarm (Fig. 4), and Nyx Mons has both a radiating (with at least two centres identified) and circumferential sets (that also define more than one centre (Fig. 4).

The dyke swarm framework we are constructing for Bell Regio will then allow a second stage of research focused on the volcanic flow history and their specific sources. As an example, Fig. 5 shows an important package of radar bright flows being fed from circumferential dykes associated with Nyx Mons.

Acknowledgments: Magellan SAR and altimetry images were obtained from <https://astrogeology.usgs.gov/search/?pmi-target=venus>, and was based on data obtained from <https://pdsimaging.jpl.nasa.gov/volumes/magellan.html#mgnFMAP>

References: [1] Campbell B.A. and Campbell P.G. (2002). USGS GIS Map I-2743. [2] Campbell B.A. et al. (1994). JGR, 99, 21153-21171. [3] Rogers P.G. and Zuber M.T. (1998). JGR., 103, E7, 16841-16,853. [4] Sawford W.C. et al. (2015) 46th LPSC, abstr. 1283. [5] Buchan K.L. and Ernst R.E. (2021) Gond. Res., 100, 25-43.

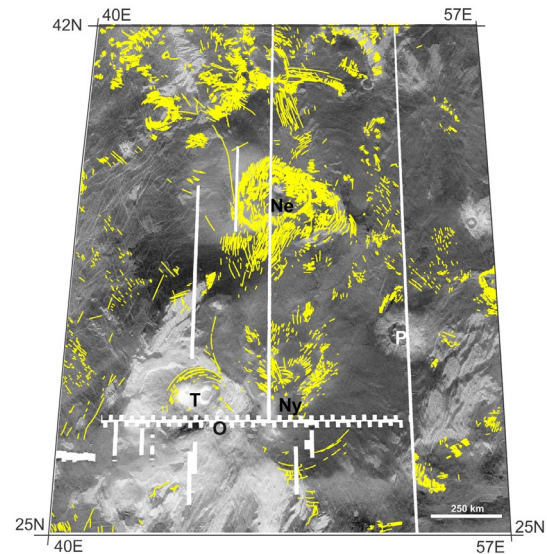


Figure 1. Preliminary map of graben fissure systems of Bell Regio (interpreted as dyke swarms). Ny = Nyx Mons, T = Tepev Mons, O = Otafuku Tholi, Ne = Nefertiti Corona, P = Potanina Crater. All lineaments are shown in yellow. 6600 lineaments mapped so far.

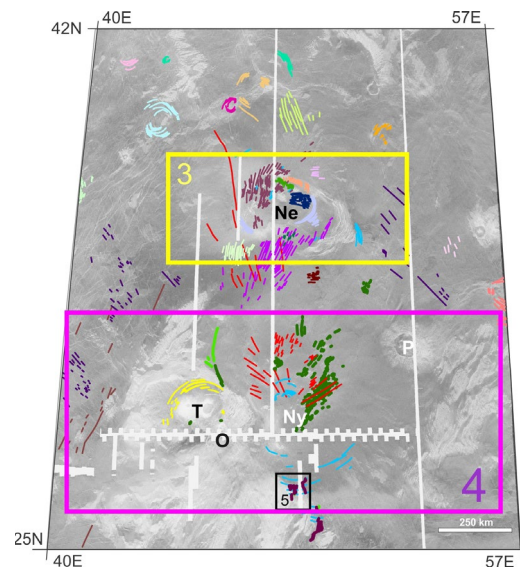


Figure 2. Extensional lineaments of Fig.1 generalized and colour-coded to represent different swarms. Note the radiating (red lines) and circumferential (blue lines) sets associated with Nyx Mons, and the yellow set that circumscribes the central portion of Tepev Mons.

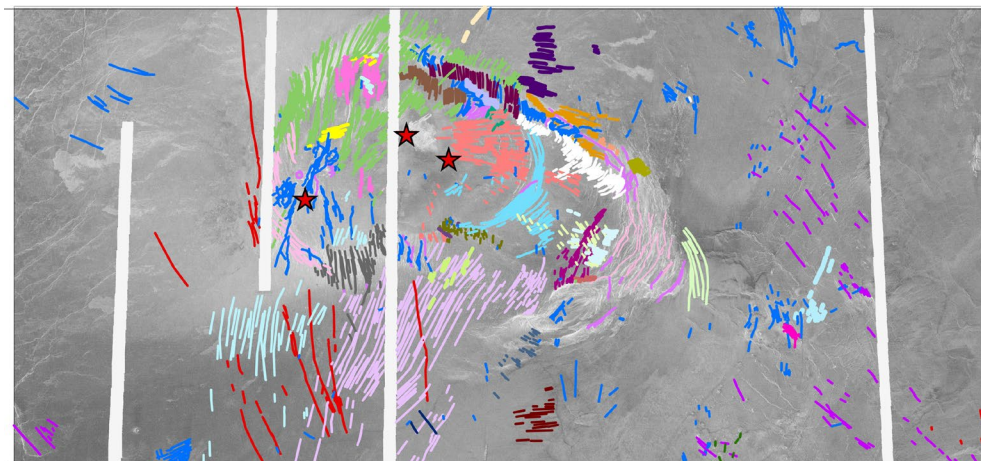


Figure 3: Detailed map of graben systems in Nefertiti Corona. See location in Figure 2.

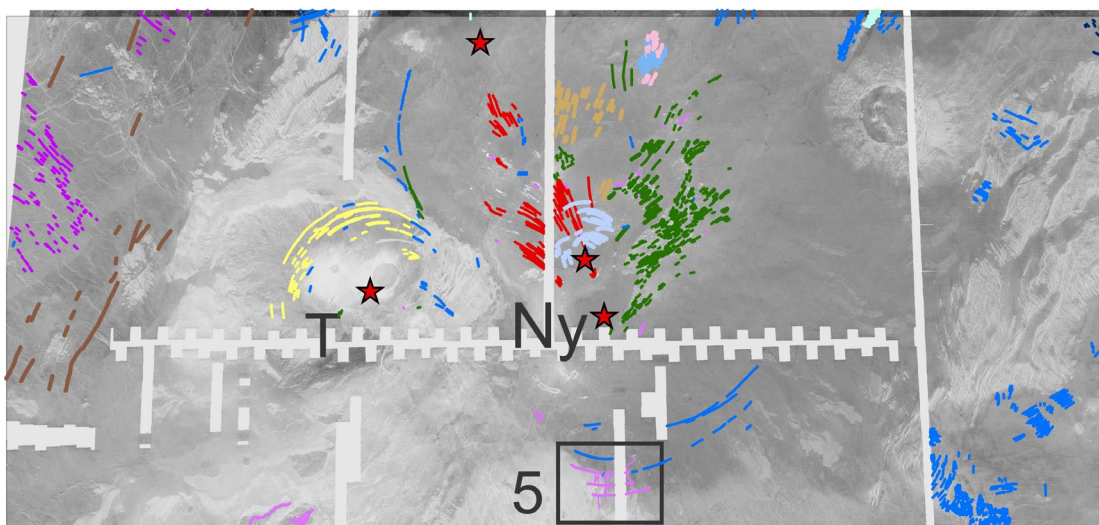


Figure 4: Detailed map of graben systems in Tepev and Nyx Mons and environs. See location in Figure 2.

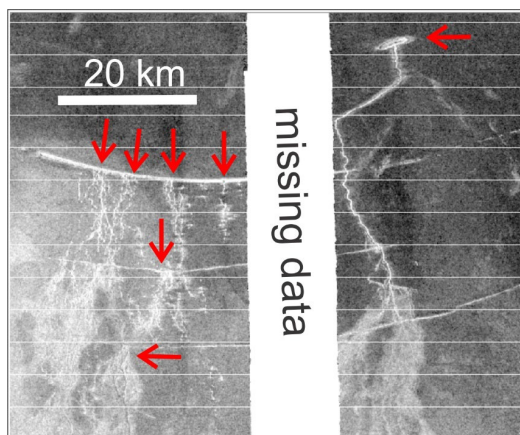


Figure 5. Circumferential dykes of Nyx Mons feeding radar bright flows. See location in Figures 2 and 4.