

DYKE SWARM HISTORY OF NABUZANA CORONA, SCARPELLINI QUADRANGLE (V-33), VENUS.

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Introduction: Previously [1], we mapped the distribution of canali in the volcanic plains W and SW of Salus Tessera, and demonstrated that two canali segments represent volcanic flows emanating directly from grabens of Nabuzana Corona. This indicates that these grabens are underlain by dykes. Here we extend this work [1] by mapping at a scale of 1:500 000 the complex graben (dyke) systems of Nabuzana Corona and its surroundings, in order to determine the magmatic and structural evolution of the corona.

Nabuzana Corona: Nabuzana Corona [2] has been identified as the more northerly of two adjacent coronae with diameters between 500 and 600 km (Fig. 1). Its southern neighbour is called Mukylchan Corona [3]. Nabuzana is located in Scarpellini Quadrangle (V-33) south of Salus Tessera and west of western Ovda Regio.

Mapping: Figure 2 provides a summary of the current mapping of grabens in the study area. The grabens are separated into radiating, circumferential and linear systems that we provisionally interpret to be underlain by dykes [4-6].

The circumferential system on the northern, eastern and western side of Nabuzana Corona (Fig. 2a, c) follows an elevated rim and inner moat, as typical of many other coronae. One of the canali, Canali A, identified in our earlier study [1] was seen to emanate directly from a graben of this circumferential swarm (yellow square in Fig. 2a), and Canali B [1] emanates from a graben in the NW-trending red swarm (blue square in Fig. 2a). In Figure 3a circumferential grabens (identified by red dots) are filled by up to 12 km wide lava flows, with local flow direction indicated by arrows.

Five radiating graben systems (or novae) are mapped in the study area (stars in Fig. 2a, b). The four most northerly novae are focused within the Nabuzana Corona annulus of circumferential grabens (Fig. 2c), with three closely grouped near the corona centre (enlarged in Fig. 3b). It is not uncommon for a nova or multiple novae to focus near the centre of a corona (e.g., [6]), in which case they are usually interpreted to be genetically related and part of a single coupled corona-nova system. The fifth nova is focused 200 km further south of the others (Fig. 2c). Its relationship to Nabuzana Corona is uncertain, as its centre is on the Nabuzana annulus, but also on the northern margin of

the adjacent Mukylchan Corona (not mapped in the present study). Some graben sets beyond the Nabuzana Corona annulus may be distal portions of the radiating graben systems of the novae. An example is the NW-trending (light green) dykes located northwest of the corona (Fig. 2b). Others, however, are likely laterally-injected regional swarms that are simply passing by the corona. An example is the broad NE-trending (dark green) swarm located to the southwest of Nabuzana (Fig. 2b); these likely have no relation to the emplacement of the corona or novae.

Conclusions: The current mapping indicates Nabuzana is a complex corona-nova system with both radiating and circumferential components. Nabuzana has four novae that focus within its annulus and are likely related. A fifth nova is located on its southern margin and of less certain origin. Further study is needed to clarify the age relationships of the various graben systems (interpreted as dyke swarms) that have been identified.

References: [1] Sanchez, J.C., et al. (2021) 52nd LPSC, Abstract No. 1324. [2] Crumpler, L.S., Aubele, J.C. (2000). In Sigurdsson, H. (ed.), Encyclopedia of Volcanoes. Academic Press, 727–769. [3] Christensen, P. R. et al. (2009) AGU Fall Meeting, Abstract #IN22A-06. [4] Grosfils, E.B., Head, J.W. (1994) GRL, 21, 701–704. [5] Ernst, R.E., et al. (2001) Ann. Rev. E Planet. Sci., 29, 489–534. [6] Buchan, K.L., Ernst, R.E. (2021). Gond. Res., 100, 25–43.

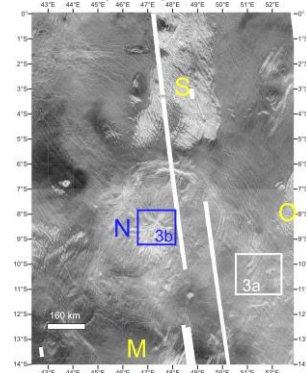


Figure 1: Magellan SAR image of the current study area with Nabuzana Corona (N), the focus of this study, and nearby Mukylchan Corona (M). S = Salus Tessera. O = western edge of Western Ovda Regio. NNW trending white bands are missing data. Location of Figure 3a and b shown.

