NORMAL FAULT KINEMATICS EXPOSING THE VENUSIAN CRUST IN DALI CHASMA, SW OF ATLA REGIO: A POTENTIAL TARGET FOR FUTURE VENUS MISSIONS:

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Introduction: Located southwest of Atla Regio, the Dali Chasma is a rift system with a length of 4,000 km. Together, the Diana Chasma and Dali Chasma, extend 7,500 kilometers to the southwest, linking the Atla Regio in the east with Thetis Regio in the west. The steepest and deepest trenches on Venus [1], the Dali, and Diana chasmata have gradients of more than 30° [2]. Landslide deposits are seen in both chasmata and are likely a result of the steep chasmata walls. As part of the mapping of the Diana Chasma Quadrangle (V-37), Dali Chasma and its western portion was mapped at a scale of 1:5,000,000 [2]. There is currently no published map of the Dali Chasma's eastern section in the Stanton quadrangle (V-38).

Figure 1 represents the location of the Dali and Diana Chasmata research areas within the Stanton (V-38) and Diana Chasma quadrangles (V–37). The tectonic and volcanic features of this rift are being mapped at a scale of 1:500,000. The remainder of this abstract will concentrate on the structural aspect that we believe is noteworthy within our map area. This aspect is thought to be a 4 km thick portion of Venusian crust that was exposed in Diana Chasma by normal faulting linked to asymmetric rifting [3].

Exposure of a 4 km Section of Venusian Crust via Normal Fault Kinematics

The rift, 1000 km long and 30–70 km wide, is located at 190°E / 10°S and trends NE, parallel to the chasmata's general trend (Figs. 1-2). Dip slip movement on the normal faults is asymmetric, being more extensive on the NW side than SE side of the rift.

In this work, we highlight one of these normal faults (Figs 2A and B) which has NE-SW trend, is 36° steep, and exposes a 4 km section through the crust. In the exposed crustal section, a radar brighter ~3 km section overlies a radar darker ~1 km section (Figure 2A, C-E). The radar brighter section locally exhibits parallel lineations which can be interpreted as either horizontal layering, potentially reflecting a flood basalt sequence or sequence of sills (locations b in Fig. 2D). Steep lines (red in Fig. 2E) are also mapped on the slope representing either traces of dykes or *material* sliding down the steep slope. Irregular areas (radar darker) can be distinguished in the deeper exposed section that could mark crosscutting intrusions (e.g., lopoliths) (locations c and d in Fig. 2D). At the base of the exposed escarpment, irregular units interpreted to represent talus are accumulated through mass wasting (location a in Fig. 2C). Closure of the rift, as shown in Fig. 2B results in the different trends of grabens (each with a different colour) having more continuous trend across the rift, and suggesting that these different graben systems were emplaced prior to the rifting.

References: [1] Ford P. G., and Pettengill G. H. (1992). JGR, 97(E8), 13103. [2] Hansen V.L. and DeShon H.R. (2002). USGS SIM I-2752. [3] Ait lahna A. et al. (2022) LPSC 1657.

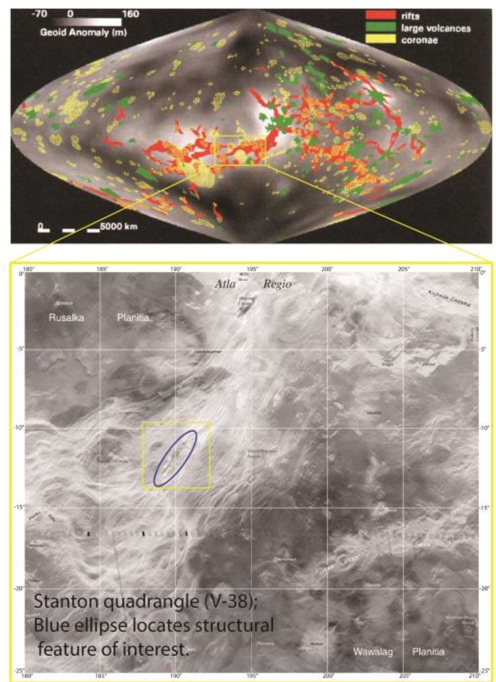
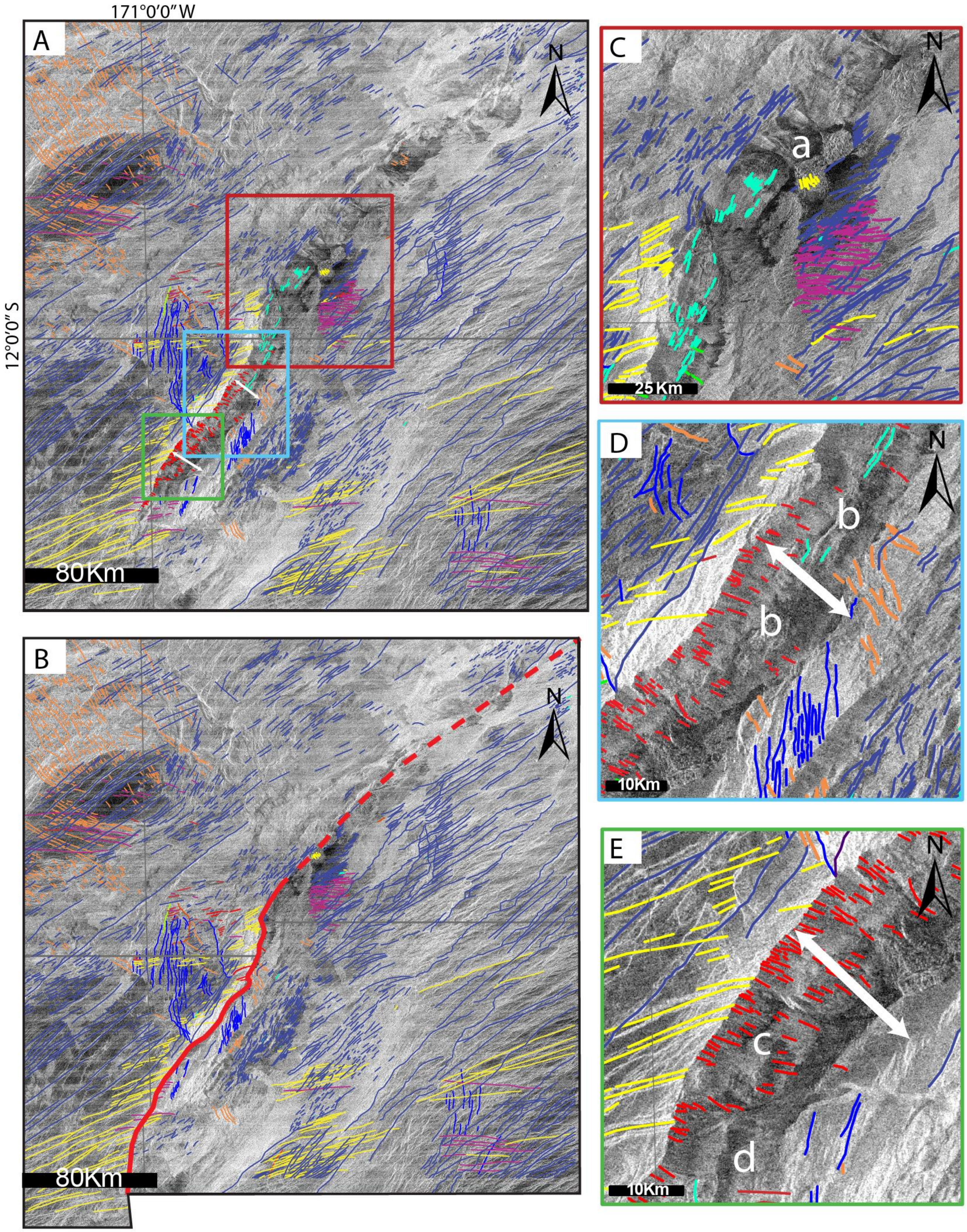


Figure 1: *The location of our study area along Dali-Diana Chasma, on the Magellan SAR image. Location of study area shown on global map of Herrick 1999*

Figure 2*: (A) Mapping of graben-fissure sets of different trends (distinguished by colour) on both sides of the asymmetric rift. White double-headed arrows indicate direction of rift opening. (B) map showing reversal of rifting by shifting the SE side of the rift by about 30 km to the NW to close the rift (C-E) enlargements of key areas with lower case letters indicating particular features of interest described in the text.*


171°0'0"W
12°0'0"S
A
B
C
D
E
N
80Km
25 Km
10Km
a
b
c
d