

VENERA-8 LANDING SITE: PRELIMINARY ANALYSIS OF MAGELLAN IMAGERY

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GEOCHEMICAL INTRODUCTION. Venera 8 was a first probe measured Venus surface composition. Based on radiotracking, the site coordinates were estimated as 10+1 S, 335+1 E (1, 2). Gamma-spectrometry measurements (3), re-evaluated in (4) showed the surface material contained K, 4.0+1.2 wt%; U, 2.2+0.7 ppm; Th, 6.5+0.2 ppm. Compositional interpretations of the analysed material span from mafic to silic and from calc-alkaline to alkaline (see review in (5)). The inferred in anticipation of Magellan data probable compositional range of Venera 8 material is silica-saturated subalkaline (quartz monzonite/quartz syenite) suggesting existence of continental crust on Venus (5). Lava of the inferred composition has to be more viscous than basaltic lavas that hopefully may be seen in the surface morphology.

PHOTOGEOLOGIC ANALYSIS of Venera 8 site was made using the Magellan engineering mosaic F-MIDRP.10S335E. At the vicinity the most widespread terrain is mottled plain (Fig. 1, 2). It is shown at the map (Fig. 1) as I. It looks at the image as a mosaic of light and dark spots peppered with small gentle-sloped edifices. Venusian plains were interpreted as covered mostly with basaltic lava flows (see for example (6, 7) and the mottled plain seems to be of the same nature. The mottled plain is crossed by swarms of predominantly NW striking radar-bright lineaments, part of which is identified as open fractures.

Within the mottled plain centered at 9.36 S, 335.27 E there is 25x25 km "pancake" construct (Fig. 3) shown at Fig. 1 as PF1. It looks similar in morphology and size to the pancake features revealed by Magellan in the vicinity of Alpha Regio tessera (8). All these pancake features resemble in their morphology the rhyolite domes of some volcanic areas of Earth, e.g. Inyo domes (9, 10), and are evidently the volcanic constructs made of viscous lavas. Centered at 9.9 S, 335.35 E a faint circular feature about 40 to 45 km across is observed. It is shown at Fig. 1 as PF2. It may be kindred to the mentioned pancakes being the elder and relaxed variety of them. The pancake feature of Venera 8 site and its larger possible analog are crossed by lineaments belonging to the NW striking swarms.

In the eastern part of the area another plain complex composed of radar-bright, dark and intermediate units is observed being evidently a complex of basaltic lavas too. It is designated at Fig. 1 as II. It is not crossed by the mentioned swarms of lineaments that makes it younger than the mottled plain and the pancake features.

DISCUSSION. Within the 100 km radius circle, centered at 10 S, 335 E that is landing site ellipse (2) all the described terrains are presented. So from the point of view of locality the Venera 8 could sample the materials either of mottled plain, or pancake features, or younger plain complex. But evident viscosity of the material composed the pancake feature seems to be in a better accordance with the evolved composition of the Venera 8 material. Mapping tectonic lineaments within F-MIDRP.10S335E, as well as north and south of it, shows that the regional tectonic pattern is expressed here in the form of ovoidal cells about 300 to 400 km across (Fig. 4). The pancake feature of Venera 8 site is near the core of one of them. Good altimetry information is needed for this region to check whether the lineament swarm are localized at the topographic high as it can be ambiguously seen at Arecibo imaging. If it is the case the ovoidal cells may be highly degraded or embryonic coronae. In this region at several places small spots of rough terrain resembling tessera are seen looking like remnants. So plain-forming basalt here may be underlied by the tessera material which considered in (11) as a possible analog of continental crust of Earth and Venera 8 site may represent a crustal sandwich with basalt material above and continental material below (5).

CONCLUSION. The best candidate for the material measured by Venera 8 is the pancake feature evidently formed by extrusion of viscous lava. This extruded material may be the result of profound differentiation of basaltic magma or, and this seems to be supported by terrestrial analogies considered in (5), it was formed due to mobilization of the supposed continental crust material underlying the plain-forming basalt.

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