

INTERMEDIATE (20-100 KM) SIZED VOLCANIC EDIFICES ON VENUS

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The total amount of the edifices with diameters of 20 to 100 km in the area surveyed by Venera-15/16 is about 800, i.e. 7 edifices per 10^6 km². Most of the edifices are dome-like and often lack the visible summit crater (Fig. 1,a). Cone-like edifices often with prominent summit craters are subordinate in abundance but not very rare (Fig. 1,b). 9 edifices have a specific tablet-like form with step-like slopes and without summit crater (Fig. 1,c). The largest size of the tablet-like edifice is 45 km in diameter and 30 km on the average. The observed decrease in the relative number of edifices with craters dependent on the decrease in their size /1/ shows, probably, the indistinct morphology of these craters. The crater/edifice diameter ratios of the intermediate sized volcanoes is 1:4.4 at the average /1/.

Positions of these edifices were placed in stereographic map projection. Then the map was spatially filtered using a gaussian weighting scheme (standard deviation of 180 km is measure of resulting map spatial resolution). Boundaries of the area surveyed by were correctly taken into account in the filtering algorithm. Resulting volcanic structure density map is shown in Fig. 1 (isodensity contour step is 6.5 structures per 10^6 km²).

The general distribution of the edifices within the area surveyed is more homogenous than the distribution of small dome-like hills (Fig. 2) /2/, although they are rather abundant were small dome-like hills are very abundant too including Akkruva-Allat volcanic belt (5000 km long - from 40°N, 135°E to 65°N, 70°E). In contrast to the distribution of small dome-like hills Akkruva-Allat volcanic belt in distribution of intermediate sized volcanic edifices is longer and reaches the region between Fortuna Tessera and Laima Tessera, i.e. the belt is about 7000 km long /6/. Besides Akkruva-Allat belt there are two volcanic belts in the area surveyed, which are less prominent but longer than one. This is the belt that is localized mainly withing Sedna Planitia (sednian belt) from Bereginia Planitia (30-40°N, 20°E) to Demeter Corona (55°N, 295°E), i.e. about 7000 km long and the second belt stretches from Ganiki Planitia (40°N, 200°E) through Atalanta Planitia to Tethus Regio (65°N, 130°E, Ganiki-Tethus belt), i.e. about 5500 km long (Fig. 2). These edifices are rather abundant in the vicinity of Renpet Mons (75°N, 238°E).

Among the other structural-tectonic complexes on Venus tesserae are characterized by minimum volcanic activity within the area surveyed (Fig. 2). It can be explained by less permeability of these venusian crust blocks. i.e. the crust blocks are, probably, deeply rooted. Fortuna and Laima Tesserae are surrounded by the volcanic edifices (Fig. 2). Minimum abundances of intermediate sized volcanic edifices are also typical for ridge belts of plains (except for area within Ganiki Planitia). These data accord with the assumption that ridge belts result from compression /3/, but not extension /4/, because terrestrial spreading fields are characterized by a high density of volcanic edifices of central type.

These volcanic edifices are superimposed on the all known types of geologic structures including the large shield volcanoes (Renpet Mons etc.). They are observed even inside impact craters (Cochran Crater for example).

References: 1) Slyuta E.N. 1990. Bull. MOIP, N2. 2) Slyuta E.N. et al. 1988. Astron. Vestn. Vol. 22, N4, 287-297. 3) Kryuchkov V.P. 1989. LPSC 20, 546-547. 4) Sukhanov A.L. and Pronin A.A. 1989. Proceed. LPSC 19, 335-348.

INTERMEDIATE SIZED VOLCANDES ON VENUS. Slyuta E.N. and Kreslavsky M.A.

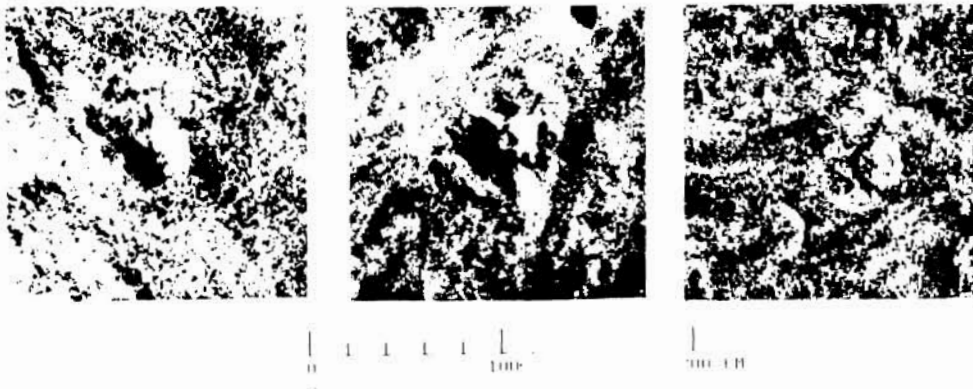


Fig. 1 Morphological types of intermediate sized volcanic edifices (20-100 km): a - dome-like; b - cone-like; c - tablet-like.

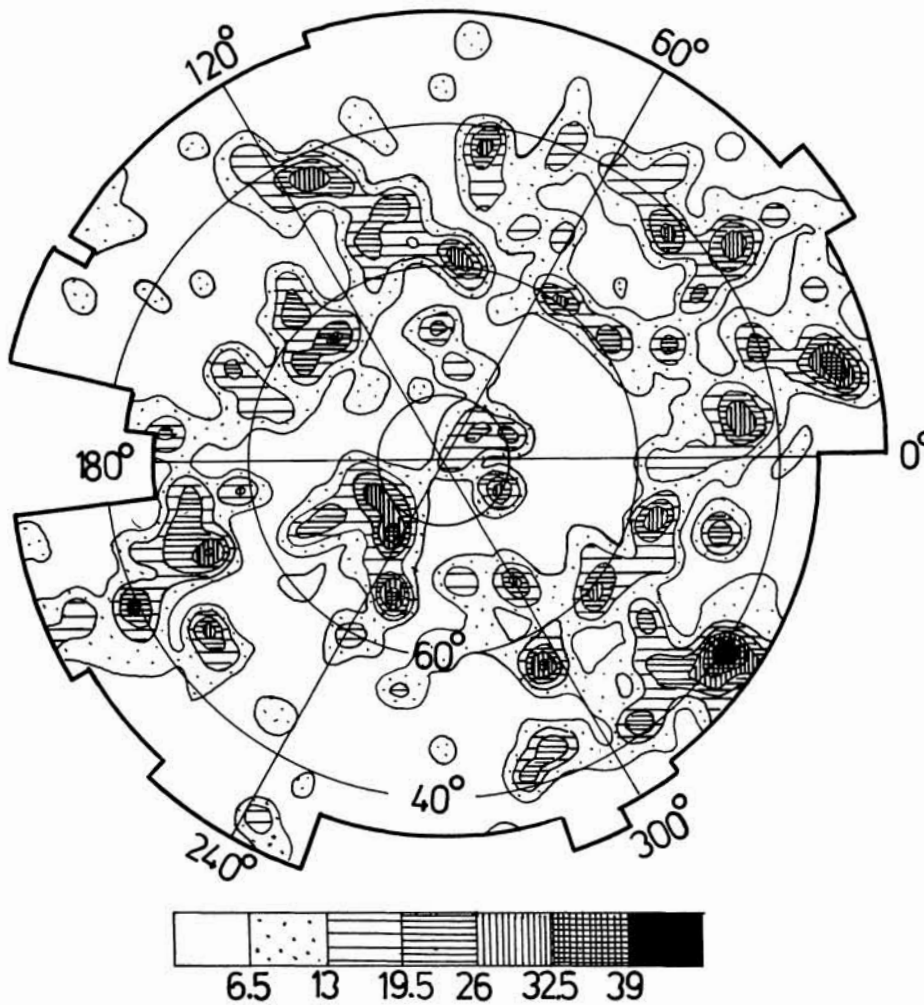


Fig. 2 Distribution of the intermediate sized volcanic edifices on the area surveyed by Venera-15/16. Isodensity contour step is 6.5 structures per 10^6 km^2 .