

ROUGHNESS OF LAVA FLOWS IN SEDNA PLANITIA
(VENUS)

M.A. Kreslavsky, V.P. Kryuchkov
Vernadsky Institute, Moscow, USSR

Comparison of Venera-15,16 (V-15,16) photomaps with Pioneer Venus (PV) data gives evidence that roughness scale of lava flows in Sedna Planitia is very small.

Bright areas in Sedna Planitia (fig.1) interpreted as lava flows [1,2] were outlined on V-15,16 photomap (fig.2). PV radar altimeter footprints lay inside outlined area were selected. "Bad" footprints where estimation of RMS slope was failed [3] were removed. RMS slope (in meter-decameter scale) and (uncorrected) reflectivity values for 5 remained footprints are plotted in fig.3 as dots in RMS slope and reflectivity axes. Typical area of plain located to south from lava flows was outlined for comparison. Formal ellipse of deviations of RMS slope and reflectivity been calculated using 45 "good" footprints lay inside this area plotted in fig. 3 too. (Correlation of rms slope and reflectivity was found negligible.)

One can see that lava flows reflectivity is considerably lower than surrounding plain one. Uncorrected PV reflectivity decreases either due to decreasing of dielectric constant of surface material or due to increasing of small scale roughness of the surface [4]. Lava flows are also bright in Arecibo images [5]. Brightness of large areas in side-looking radar images (both V-15, 16 photomaps and Arecibo images) increases either due to increasing of dielectric constant or due to increasing of surface roughness. The evident possibility is that lava flows dielectric constant is similar to surrounding plains one and lava flows roughness is higher. However there is no considerable difference in rms slope in meter-decameter scale (fig. 3). Thus lava flows differ from surrounding plains only due to high small-scale (centimeter) roughness.

Low scale roughness (centimeter-decameter) of terrestrial lava flows are observed in pahoehoe type flows. The flows in Sedna Planitia seem to be formed by low viscosity lavas.

References:

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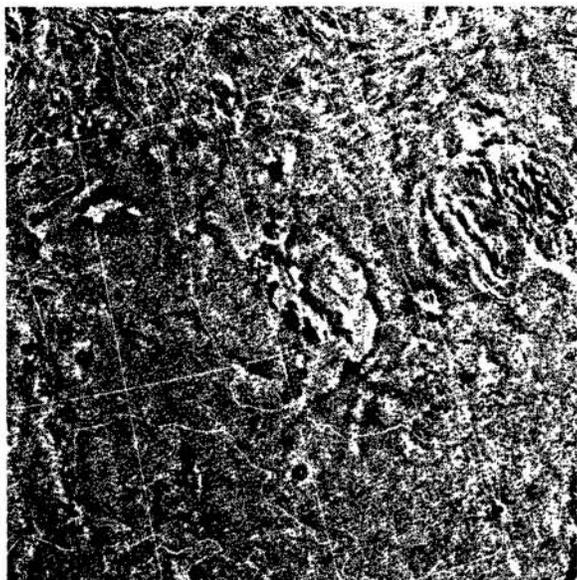


Fig. 1

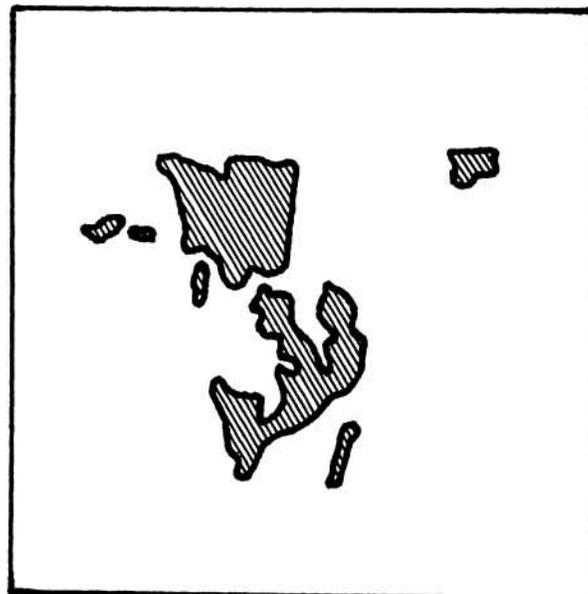


Fig. 2

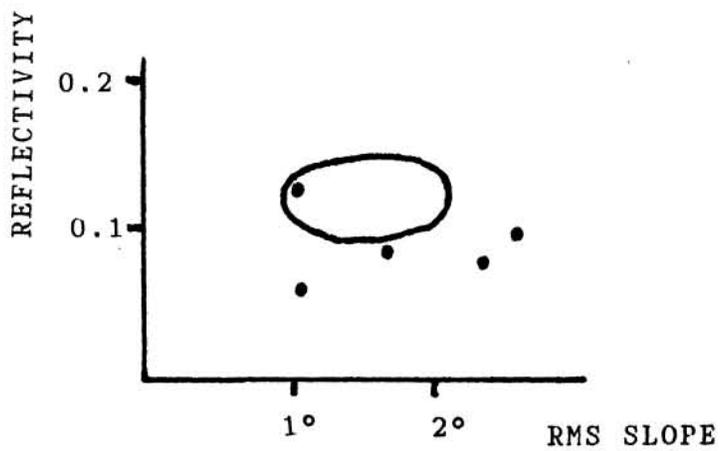


Fig. 3