LITHIFICATION AND DISINTEGRATION ON THE SURFACE OF VENUS. C.P. Florensky (1), A.T. Basilevsky (1), V.P. Kryuchkov (1), R.O. Kusmin (1), O.V. Nikolaeva (1), A.A. Pronin (1), I.M. Chernaya (1), Yu.S. Tyuflin (2), A.S. Selivanov (2), M.K. Naraeva (3), and L.B. Ronca (4). (1) Vernadsky Institute, USSR Academy of Science, Moscow, USSR; (2) Central Scientific Research Institute for Geodesy, Moscow; (3) State Scientific Research Center for Natural Resources, Moscow; (4) Department of Geology, Wayne State University, Detroit, MI 48202, USA.

The Venera photographs show abundant evidence that presently solid rock units have been undergoing disintegration (1). This is evident from the slabs of Venera 9 and from the many fragments accumulating in front of scarplets and obviously derived from the rock units themselves. Analyses of the solid rock units of Venera 13 and 14 photos suggest that these rock units may not be simply solidified lava, but may be the product of lithification of loose material (aeolian deposit, pyroclastics, ballistic sediments, or whatever). Fig. 1 shows the thin layering of the rock units, with the uppermost layer displaying a stratigraphic window. Fractures are curvilinear and do not encompass more than one layer. These fractures suggest surface lithification of loose material (duri-crusting). Fig. 2 shows that fine material blown up during landing came to rest in alternating bands. Perhaps this is caused by the fine material coming to rest in the depressions of ripple-marks. A similar interpretation can be given to the bands of Fig. 3. Surface undulations of the solid rock units are also shown in Fig. 4. The present loose material shows no evidence of ripple-marking, micro-duning, shadowing or other evidence of transportation. Attention is called to the fact that the original photos are much clearer than these reproductions.

If these interpretations are correct, changes have occurred in the surface conditions of the landing sites. Sometime in the past, loose material was brought in by processes involving air currents (winds due to climatic effects, or to volcanic or impact events, or turbidity currents resulting from tectonic instabilities on slopes, or whatever). Subsequently the loose material was lithified. The next environment was one of disintegration of the lithified material, but of little or no transportation (except for mass-wasting of Venera 9). Changes in T-P conditions could accomplish some of these effects (2).

It is possible that lithification versus disintegration is not just a one-event phenomenon, but represents the opposing sides of a process continuously operating on the surface of Venus.

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(2) Vinogradov, A.P. and Volkov, V.P. Geokhimiye, 7, 755 (1971).
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Figure 1

Figure 2

Figure 3

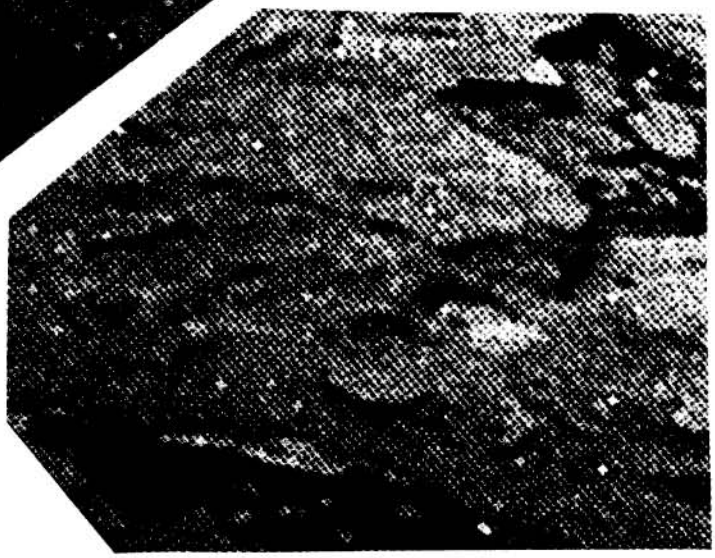

Figure 4