FIRST PANORAMAS OF THE VENUSIAN SURFACE. C.P.Flen- 
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On October 1975 the probes Venera 9 and 10 transmitted to 
the Earth the TV pictures of the vicinities of their landing 
sites (Fig.1). Coordinates of the latter are 32°N, 2910E and 16°, 
2910E correspondingly. The pictures were taken by cameras look- 
ing from view-ports at about 0.9 m above the ground. The dire- 
tion of sight was inclined 50° from spacecraft’s equator. Cam- 
era resolution was 21 minutes of angle. The nominal field of 
view is 40°x180° (1).

Venera 9 landed on a steep (15–250) slope composed of 
sharp-edged boulders and a fine-grained matrix. The albedo of 
both types of features is very low (1). The light colour of the 
boulders on the picture is mainly due to artificial contrast 
enhancing. The horizontal dimension of boulders is up to 50–70 
and a vertical dimension is not more than 15–20 cm; their 
upper surface is roughly flat and parallel to the ground. So 
the descriptive term “slab” is given to these boulders. Some of 
the slabs show a sort of layering subparallel to their upper 
surface. Rarely on slab surfaces one can recognize some small 
spots resembling the latter on Venera 10 outcrops. The surface 
between the slabs has the darker colour and seems to be composed 
bys particles finer than the camera-resolution although a 
few fragments with a diameter of a few cm are visible. Besides 
small “humps” are present giving a textured appearance to the 
matrix surface.

Venera 10 landed on a plain composed of scattered outcrops 
(1–3 m in diameter) separated by fines similar to the matrix on 
Venera 9 panorama. The outcrop visible on the right side of Ve- 
nera 10 picture shows evidence of layering slightly inclined 
from the horizontal position. The surface of the outcrops gives 
the impression of several types of destruction: the fracturing 
of outcropping rocks, the smoothing of edges similar to the sa- 
nd corrosion and the formation of dark spots resembling the 
cellular weathering.

So the landings at two areas of Venus have revealed two 
different kinds of landscapes. The presence of steep slope co- 
vered by sharp-edged slabs is evident of the geological “juvenile- 
ance” of the landscape of Venera 9 site. Plain-like character of 
the terrain as well as the traces of surface destruction of out- 
cropping rocks is evident of the “maturity” of the Venera 10 
site landscape.

However both landscapes have some similarities (2): the 
measurements of the radioactivity of surface material and the
rock density are interpreted as the indications on the basaltic composition of the Venusian rocks (I). The layering is typical for a hard rock material of both sites. The presence of fines together with the slabs and outcrops gives the evidence of surface reworking processes.

These processes are difficult to consider without the adoption of rather extensive surface chemical transformations. As the example the interaction of basalts and carbon dioxide Venusian atmosphere containing about 0.1 vol.% of H₂O could be resulted in the formation of calcite as well as the hydrated silicates with OH-groups ≤ 2 (2). The deficiency of any active solvent as H₂O provides the inert behavior of the petrogenic elements and virtual mobility of CO₂, H₂O similar to isochemical metamorphic processes on the Earth. The absence of significant diurnal, seasonal and latitudinal temperature variations present the constraints on the development of implied surface transformations.

We suggest that the vertical atmospheric T-P gradient leads to significant differences in surface environment and could serve as the stimulating factor in relation to surface chemical reactions. In the case of ~5-6 km altitude variations (I,5) the environment variations are ~50° in temperature, ~40 atm in pressure. For the wollastonite equilibrium, if ever, it would result in carbonatisation of surface rocks on highlands and in decarbonatisation on lowlands (Fig.2). The reactions mentioned are characterized by significant changes of solid phase volumes that is favourable for the development of reactions and therefor could promote for decomposition of massive rocks as well as for cementation of fines. If any processes provide the transport of material along the T-P gradient some exogenous geochemical cyclic processes could be in existence on the Venus and minor atmospheric constituents could be extensively involved in these processes also. But now the problem is in the nature of the observed slabs and outcrops: either they are the magmatic rocks or the products of their reworking on the Venusian surface.
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Fig. 1 (above) Computer enhanced TV pictures taken by Venera 9 (above) and Venera 10 (below).

Fig. 2 (left) The stability fields of wollastonite equilibrium in terms of the adiabatic gradient taken from (4).

References