ring on both sides of the spacecraft, and a change in the accumulation of dust on the lander ring as a function of time on the surface of Venus was also reported [*Selivanov et al.*, 1982]. The fines on the spacecraft landing ring probably represent the dust fraction of the fine materials and are likely to be < 100 μm (0.1 mm) in diameter [*Garvin*, 1981]. A few pebbles can also be observed on the lander ring (Figure 7). These fragments are likely to have been transported to their present position by means of landing-induced effects such as turbulent eddies. This same effect may have caused transport of small fragments onto the soil and bedrock surfaces.

In summary, (1) the Venera 13 site is characterized by a fractured, somewhat platy bedrock surface very similar to that observed at Venera 10 and a bimodal distribution of fragments, (2) the larger fragments are concentrated in local mounds and are generally similar in morphology to fragments observed at the Venera 9 site, and (3) dark, fine materials mixed with small fragments occur in zones separating bedrock exposures, as observed at Venera 10.

Venera 14

The most striking feature of this locality is the predominance of bedrock, which occurs over nearly 100% of the surface visible in the panoramas (Figures 8, 9, 12, and 13). Discrete fragments and some fine materials at the boundaries of bedrock plates can be recognized amidst the continuous exposures of platy and layered bedrock. There are no continuous soil patches mantling the bedrock exposures as seen at Veneras 10 and 13. There are no extensive blocky coverings as seen at Venera 9 and no block clusters as seen at Venera 13.

The most abundant bedrock exposures at Venera 14 are typically interlocking subhorizontal polygonal plates which have variable surface texture. Bedrock surface textures include shallow cuplike depressions or pits, elongate depressions resembling flutes or grooves, cuspate scarps somewhat similar to those at Venera 13 in morphology, wavy and linear undulations, and linear fractures often filled with low-albedo fine materials. Several areas of more irregularly textured bedrock occur within the regions of platy bedrock. In some cases the irregular texture is dominated by small lobate or tonguelike layers and a somewhat ropy texture (Figure 8, right-hand side). In other cases the irregular texture appears to be a series of small, slightly disrupted plates occurring between the larger, more continuous bedrock plates (Figure 9, left-hand side). The extensive bedrock plates at Venera 14 share many of the characteristics of bedrock exposures at Veneras 10 and 13.

One of the most distinctive aspects of the bedrock at Venera 14 is the presence of horizontal to subhorizontal layered plates with thicknesses of several centimeters. Layer thicknesses are variable, ranging from a few to tens of centimeters. Sublayering can also be recognized. The most prominent example of layering occurs in the middle left of Figure 9 where a low-albedo layer clearly overlies a higher-albedo layer. A small hole in the low-albedo layer reveals the presence of the underlying layer and indicates the thinness and continuity of the upper layer. The lateral continuity of individual layers is difficult to determine, but several extend over several meters distance. In numerous cases, bedrock layers are observed to overlap, particularly in the more irregularly textured bedrock regions, where tonguelike overlaps are sometimes observed (Figure 9).

Fractures in the Venera 14 bedrock are abundant and range from several extensive linear fractures similar to those seen at Veneras 10 and 13 to a host of polygonal fractures which break up the surface bedrock into smaller in situ plates. In some cases, fractures appear not to extend through the uppermost layer. The extensive polygonal fracture patterns at the scale of tens of centimeters are unlike the more widely spaced fracture patterns of Veneras 10 and 13. They may, however, be the type of fracturing that would aid in the production of the jigsaw-puzzle-like exposures at Venera 13 and the extensive polygonal blocks observed at Venera 9.

There are extremely few discrete fragments larger than 10 cm in diameter at the Venera 14 site. Of the few fragments that can be identified, most are platy, angular to subangular in outline, and variable in albedo. One 0.5-m-long tabular block in the near field displays a layered or striated surface. In some cases, the smaller fragments can be geometrically fitted into adjacent bedrock. In general, fragments appear to cluster in local patches between platelike bedrock exposures. This is similar to the rock clusters observed at Venera 13. In the near field, pebble-sized fragments occur either in depressions or fractures between bedrock plates or in a diffuse zone around the lander ring on the penetrometer side of the spacecraft (Figure 8). In the far field, fragments appear predominantly in local patches between extensive flat platy bedrock exposures. In one case, a fragment dislodged from bedrock has exposed a high-albedo surface on the underlying layer and the underside of the dislodged fragment.

There is a distinct paucity of fine-grained material at the Venera 14 site relative to other sites. Low-albedo fines appear to be preferentially deposited in the linear and polygonal fractures which define bedrock plate boundaries. These fine materials have a grain size less than the resolution of the camera and probably represent a dust fraction, similar in properties to the finest materials at the other Venera sites. Some of this dust material was perturbed by the spacecraft landing enough to be carried at least 10 cm off the surface and onto the lander impact ring.

In summary, the Venera 14 locality is characterized by (1) the dominance of continuous, flat, multilayered bedrock exposures, (2) a paucity of fines and fragments, and (3) the variable albedo of bedrock layers with the uppermost layer in one area having a low albedo.

4. SUMMARY AND DISCUSSION

The following points summarize the geological observations derived from the Venera panoramas at Veneras 9, 10, 13, and 14 (this work and *Florensky et al.* [1977*a*, *b*, *c*, *d*, 1982*a*, *b*, 1983*a*, *b*, *c*]) and present additional observations which might be relevant to the interpretation of geological processes operating at each site.

Bedrock

Panoramas of the sites reveal that bedrock exposures dominate the Venera 14 site and comprise at least a third (Venera 10) to one half (Venera 13) of two of the other sites. This is truly remarkable considering that the landing sites are separated by several thousand kilometers. On the moon, bedrock exposures are almost unknown, and on earth they are relatively rare. On Mars, they are also likely to be uncommon [*Kieffer et al.*, 1977], although some bedrock appears to be exposed at the Viking lander 1 site [*Binder et al.*, 1977; *Mutch et al.*, 1978].

The surface topography ranges from several tens of centimeters (Veneras 10 and 14) to possibly several meters (Venera