



Fig. 17. (a) Margaritifer Sinus region and multiringed basins revealed by the concentric arrangement of massifs. The left arrow indicates the area in Figure 16a; the right arrow the area in Figure 16b. Viking mosaic 211-5821.

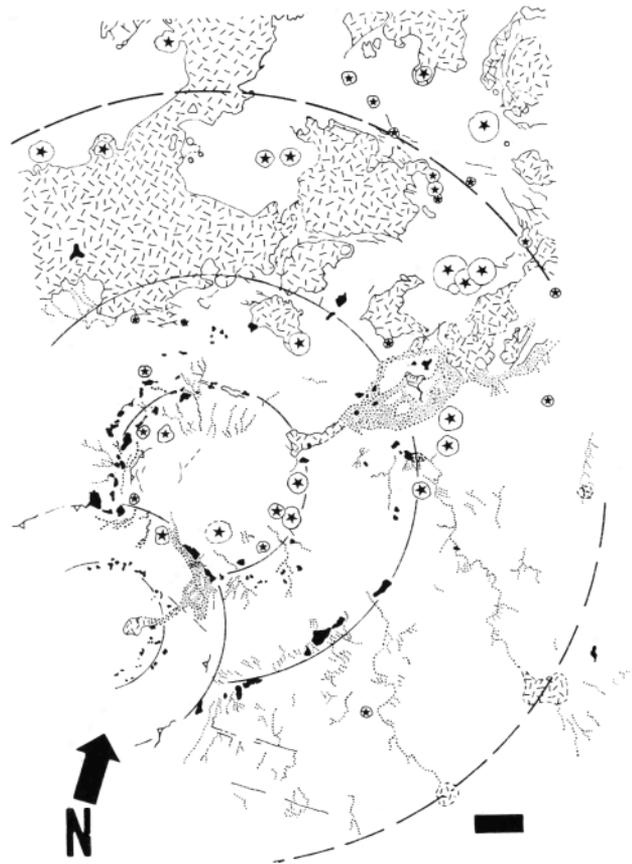


Fig. 17. (b) Sketch map identifying massifs (solid areas) chaotic terrain (patterned areas), flow-out channels (stippled areas), narrow dendritic channels (dotted lines), and floor-fractured craters (stars). Features are generally controlled by two overlapping multiringed basins. Source regions of outflow channels and chaotic terrains typically occur along one of the three basin rings. Bar scale represents 100 km.

along the floor/wall contact; a central collapse zone. However, the example in Figure 15 also displays an unmodified peripheral zone encircled by an additional zone of extensive, but localized modification. Although it is particularly well developed to the south, this concentric zone of fracturing and chaos also occurs to the west and north. The Ares outflow channel originates in the southeast section of the concentric fracture zone and follows it to the east and north. A channel to the west of Aram Chaos originates in the same zone. It is proposed that this structure represents a multiringed basin buried by an early stage of crustal volcanism. Later igneous activity along the old basin ring zones melted subsurface ground ice. A sudden release of the resulting warmed slurry resulted in the chaotic terrain and outflow channels.

Figures 16 and 17 illustrate a region farther south where remnants of a partly buried basin remain exposed. The basin was identified from Mariner 9 images but is more clearly delineated in earth-based radar data [Saunders *et al.*, 1978]. Figure 16a includes the western portion of the inner ring of massifs where numerous channels extend to the basin interior. Extensive concentric fracturing has occurred at the base of the massifs and within many smooth-floored craters. Figure 16b shows the eastern portion of the basin where a region of chaos occurs along the inner ring. Smooth-floored and braided channels extend from this chaotic terrain to the east.

The regions shown in Figure 16 are indicated in Figure 17a. Figure 17b is a sketch map which identifies the important

physiographic features of Figure 16. The distribution of massifs and associated narrow channels reveals two overlapping multiringed basins. Floor-fractured craters and small regions of chaotic terrain are concentrated along the outline of the basin rings, which are extrapolated from identified massifs. Moreover, the arcs of chaotic terrain within Margaritifer Sinus appear to be concentric to the eastern basin.

The large multiringed basin delineated in Figure 17 appears to structurally control the development of the chaotic terrain in this region. It is proposed that igneous intrusions along basin-controlled faults may have been major contributors to the development of the chaotic terrain in a manner analogous to the processes proposed for Aram Chaos.

The arcuate network of closed and interconnected depressions comprising Noctis Labyrinthus (98°W, 10°S) may represent a mega-example of igneous modification of a buried impact structure. The arcuate pattern resembles the collapse zones within smaller modified craters (e.g., Figure 8) and around portions of the multiring basin shown in Figure 17. Although the arcuate pattern is incomplete, it is mirrored to the south by a subtle, irregular scarp and the inner boundary of a cratered plains unit mapped by Masursky *et al.* [1978]. These features enclose Syria Planum, a smooth, plains-filled depression. Concentric patterns of scarps, massifs, and high-relief cratered terrains surround Syria Planum to the south as far as 2000 km from its center. Figure 18 illustrates a few of these massifs that protrude above the lava-filled plains. The