GEOLOGICAL EVOLUTION OF CORONAE (COMPLEX CIRCULAR FEATURES) ON VENUS; Harold Masursky, U.S. Geological Survey, Flagstaff, AZ 86001

Many volcanic constructs with summit calderas have been identified on Venus from ground-based radar and Pioneer Venus radar images and altimetry (e.g., Rhea and Theia Montes in Beta Regio, Maat Mons, and Sapas Mons). Many of these features have positive gravity anomalies (Masursky et al., 1980; Sjogren et al., 1983). Special enhancements of an equatorial Pioneer Venus image show 52 circular features with minor relief. The Venera 15 and 16 images show more than 25 large multi-ringed circular features with low relief that have been called coronae (Barsukov et al., 1986). Basilevsky et al. (in press) also identified many putative circular impact craters, almost all much smaller than the coronae. Some coronae are degraded (Fig. 1a); others are ovoid (Fig. 1b). Some look very fresh and display radiating features that may be lava flows and/or dikes (Fig. 1c). Similar ovoid features are ring-dike/cone-sheet complexes of different ages which are common on Earth. These complexes have been mapped in great detail in New England (Billings, 1962); the Oslo region, Norway; South Africa; and Scotland and Wales. They are notable for the occurrence of exotic alkalic rocks. Shown in Figure 1d is a map of a complex in Norway (Holtedahl, 1960) and in Figure 1e an inferred cross section of such a complex (after Anderson, 1924). The Venusian examples are larger than the terrestrial examples, and some display the surface volcanism that has been inferred by investigators of the eroded terrestrial examples. Anderson (1924) inferred that the terrestrial complexes formed by multiple intrusions around a central stock, forming the ring patterns. Similar processes may have formed the Venus coronae.

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CORONAE ON VENUS
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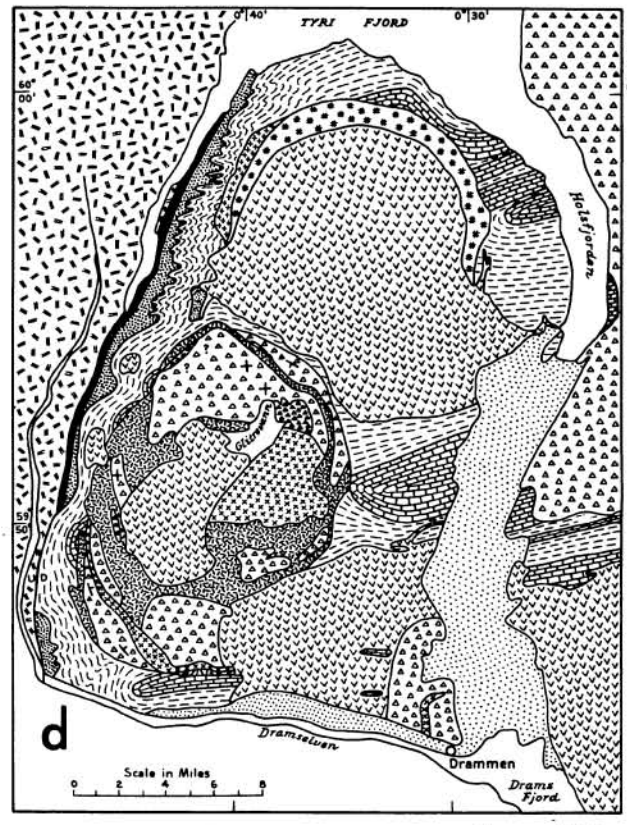

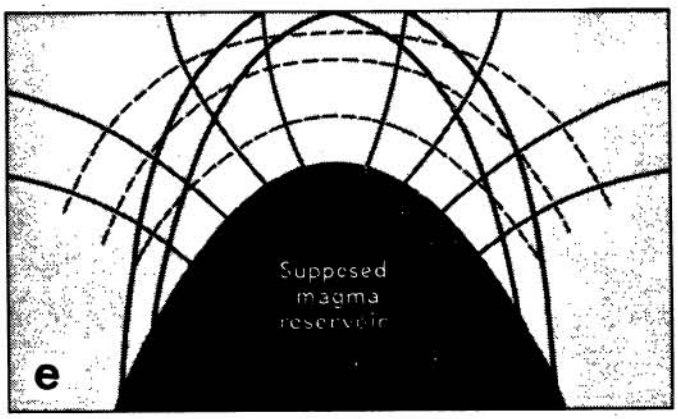

Figure 1. (a) Anahit Corona; about 300 km diameter. (b) Nightingale Corona; about 450 km diameter. (c) Anahit Mons; 100 km central structure; flows about 500 km diameter. (d) Ring-dike/cone-sheet complex (about 40 km diameter) Oslo, Norway; Holtedahl, 1960. (e) Ring-dike/cone-sheet origin (after Anderson, E. M., 1924).