ARACHNOID STRUCTURES ON VENUS: MORPHOLOGY AND DISTRIBUTION E.R. Stofan and J.W. Head, Dept. Geological Sciences, Brown Univ., Providence, RI 02912

Arachnoid or spider structures were first described by Barsukov *et al.* (1986) (1) as ring-like structures outlined by ridges or radar albedo bands. The ridges are 100-200 km long, 10-20 km wide in radial and concentric patterns that merge with other ridges to form braids and belts (1). Arachnoids are smaller than coronae (2) and are not characterized by an annulus of closely spaced ridges, and are more similar to the narrow-rim depressions and volcanoes described by Nikolaeva *et al.* (1986) (3). The majority of arachnoids are located in the lowlands (6050.5-6051.0) south of eastern Ishtar Terra between Sedna Planitia and Bell Regio. In this abstract, we briefly characterize the morphology, distribution and topography of arachnoid structures.

Arachnoids are characterized by three main elements- linear features, a central dome and arcuate structures or rings. The linear features are radar-bright lines 100's of kilometers long and < 10 km wide that frequently turn into ridges. The linear features generally follow the regional trend of lineaments, which in the Sedna Planitia region is northeast or northwest (Fig. 1a, b). Near the spiders, the linears frequently converge or become focused toward the center of the arachnoid. In regions where many spiders are located close together, the linears form a chaotic pattern or "web". In some cases, the linear features cut the arachnoid, while in other places the archnoid overlies the linear features, suggesting a contemporaneous origin. Sukhanov (1987) (4) has interpreted the linear features to be dikes, formed in conjunction with central volcanic features described below. Dike width and length are a function of rock strength and elastic parameters, regional stress gradients and gravity (5). Unless these parameters are fundamentally different than on Earth, dike systems on Venus should be similar in size to terrestrial dike systems - less than 20 m wide, a few kilometers long (5). The linear features could be the surface expression of volcanic activity associated with dike intrusion, but we interpret the linear continuity of the features to indicate they are tectonic in origin, in places 'perturbed' by the spiders. We interpret the linear features to be compressional in origin due to their overall morphology, sinuosity, and similarity to compressional features described by Kryuchkov (1988) (6). The center of many arachnoids are characterized by a dome. The domes have widths of <10 to over 30 km, and are sometimes characterized by a central pit. Some domes are surrounded by radial flow-like features, which in some cases overlie the linear features. As the arachnoids become more complex, the central feature becomes smaller and more subdued. Some spiders do not have a central dome, and are characterized by a single ring. The central domes are interpreted to be volcanic in origin (4). The arcuate rings characteristic of arachnoids have saucer-like topography (4). Most arachnoids have only one ring, but can have up to four. The rings are not symmetrical about the central dome, and sometimes occur in very irregular shapes. The average width of an arachnoid to the outer ring is approximately 100 km.

Arachnoids occur in two main areas, in Sedna Planitia and south of the ridge belt province at approximately 40° latitude, 215° longitude (1). The Sedna cluster is composed of over 30 arachnoids in a region 2000 x 3600 km. The cluster is located in a fan-like distribution at the change in orientation of a major ridge belt (Fig. 1a, b). The group of 10 arachnoids southeast of Atalanta Planitia is smaller, in a region 1000 x 1500 km. This group is located near the termination of a series of ridge belts.Other arachnoids can be found scattered in the plains (1). Both of the arachnoid clusters occur in lowland regions; the Sedna cluster is in a region that slopes gently up to the north. Individual arachnoids correspond to no change in elevation or are depressions approximately 0.5 km below the surrounding terain (4). The low elevation of some features may indicate that subsidence has taken place.

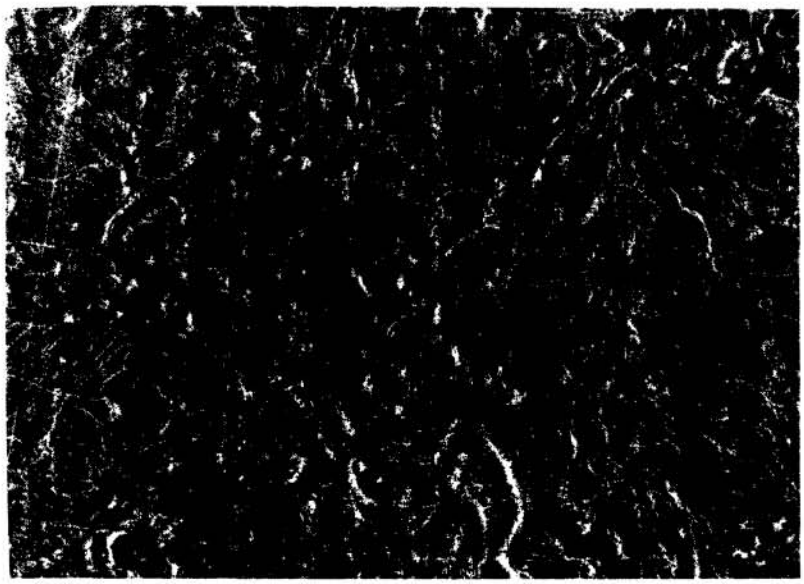
Arachnoids are characterized by central volcanic structures surrounded by rings and linear features that we interpret to be tectonic in origin. Arachnoids tend to form in clusters, and are associated with changes in orientation or terminations of ridge belts which have been interpreted to be compressional in origin (6). We are currently analyzing the morphology, distribution and topography of arachnoids in order to determine a mode of origin and to link them to tectonic processes in the northern hemisphere of Venus.

References. 1) V.L. Barsukov *et al., JGR, 91*, 378, 1986. 2) A.A. Pronin and E.R. Stofan, LPSC XIX, this volume. 3) O.N. Nikolaeva *et al., Geochimia, 5*, 579, 1986. 4) A.L. Sukhanov, *LPSC XVIII*, 1987. 5) J.W.

Head and L. Wilson, *JGR, 91*, 9407, 1986. 6) V.P. Kryuchkov, *LPSC XIX*, this volume.

Figure 1. a) Venera 15/16 image of south-central Quadrangle 12. b) Sketchmap of spiders and linear features in south-central Quad 12. Open circles are craters, dark circles are domes, plain lines are ridges and lines with balls are furrows.

1a.



1b.