Elevation Distribution, Diameter, Morphology of Small Volcanic Edifices on Venus Between Guinevere Planitia and Sedna Planitia, O. Breitschger, M. Lisi, C.F. Mcginley, B.V. Tucker, Tucson AZ. Advisor: J.F.Lockwood (Sahuaro High School, Tucson AZ, 85710)

Introduction: Current studies done by Sahuarro research team support the theory introduced by Saunders et. al. that volcanic features are not evenly distributed on the surface of Venus. The research team surveyed three FMDRS, located between Guinevere Planitia and Sedna Planitia, centered at 330 degrees longitude and 24 degrees latitude. In a predominantly lowland area like the one that was selected for study, Head et. al. have theorized that a scarcity of volcanic features due to altitude dependent inhibition of volatile exsolution may exist, with the resulting production of neutral buoyancy zones sufficient to form magma reservoirs and favoring flood lava's at lower elevations.

Observations: Team researchers located and measured small volcanic edifices (1 to 20 km) in 3 FMDRS taken from Venus Magellan Mosaic Image Data sets. Using the four classifications (shield-shaped, dome-shaped, flat-top, and cone-shaped) described by Aubele, 1993, 1,034 volcanic edifices were classified.

Researchers used a 149 PDS program, the volcanic edifices were located by centering the cursor on the summit pits, then recording their latitude and longitude. The diameters were measured in kilometers by averaging the distance across the horizontal and vertical axes.

The elevation was recorded by using the GXDR Elevation and Altimetry Disk. To find the elevation, the latitude and longitude of the edifices were located on the topographic image and the elevation was recorded directly from the results box in Image 149.2.

Results: Illustrated in Figure 1 is the percentage of small volcanic edifices by type. The dominating class was shield-shaped edifices, accounting for 52% of the total edifices measured. Cone-shaped edifices accounted for 30.9% of the edifices; while domes 16.6% were domes, and at .5% were flat-tops. The percentage of shield-shaped edifices is identical to the findings of the 1995 Sahuarro High School Research Class, and very similar to the results of the 1994 Research Class.

All results differ greatly from the study conducted by Head and Aubele, who reported 85% of small Venustian edifices to be shield-shaped.

The distribution of volcanic diameters is shown in Figure 2. The peak of the graph occurs at approximately 2.8 km. Out of 1034 edifices sampled, 17.2% occurred in the 2.5-3.0 km size range. Our data corresponds to the results from previous studies that show the most small cones appear to fall in the 2.0-3.0 km diameter range. The frequency of small Venustian edifices occurring in such a small size range is similar to Earth's volcanic distribution. A 200 cone sample of terrestrial submarine cones by R.C. Searle shows a distinct peak (30% of sample) between edifices with diameters of two to three kilometers.

Our sampling area's distribution by elevation (Figure 3) appears to contradict previous findings by Sahuarro Research Class, 1994, and Head et. al., 1992. The graph shows an uneven distribution below the MPR (6051.4 km). Our findings show a much higher percentage of cones at a lower elevation than any previous study. The elevation distribution makes a dramatic downward turn at elevation 6051.15 km, and there are no cones found near the MPR. This result may be due to the fact that our sample area was taken in a basin region.

Conclusion: Volcanic edifices are not uniformly distributed on the surface of Venus. This study shows that the distribution by elevation does not follow the neutral buoyancy theory of Head, et. al., 1993, perhaps due to the elevation configuration of the sample. Although the percentage of edifices in each of the four classes may be similar in different topographic regions, the distribution of small edifice diameters appears to be very uniform, peaking between 2 and 3 km. This distribution is very similar to the size and distribution of small volcanic cones on Earth.
Small Volcanic Edifices: Bretschger, Lisi, McGinley, Tucker