Large Venusian Shields: Characterization and Comparisons; M. S. Edmunds, Dept. of Geosciences, University of Houston, Houston, TX, 77004.

Introduction

Previous studies of venusian volcanism have concentrated on the characteristics of volcanoes on the large upland areas of Venus (e.g.,Senske and Head,1988;Campbell et al.,1985;Magee and Head,1988). The purpose of this study is to draw attention to certain volcanic features west of Ishtar Terra, as well as west and northwest of Beta Regio and make some preliminary comparisons with martian and terrestrial shields. These features tend to be isolated and are not associated with the broad tectonic uplifts that characterize some of the more well studied venusian volcanic provinces. Their occurrence in a relatively simple tectonic setting should enhance their interpretability and increase their usefulness in deciphering volcanism on Venus.

Discussion

Using the Venera 15/16 data set, three shields have been studied so far. They are Renpet Mons (76°N, 237°E) (figure 1a), and two unnamed features at 44°N, 241°E (figure 1b), and 52°N, 267°E. They are all quite large, being more than 300 km across, and are low in comparison to their size. Renpet Mons and the shield at 44°N, 241°E are about 2.5 km above mean planetary datum. The third at 52°N, 267°E is 1 km above datum. Their tectonic settings appear relatively simple, with the shields occurring on the eastern edge of the ridge-belt province that is west of Ishtar Terra. The shield at 52°N, 267°E appears to lie on an extension of the Beta Regio rift zone, but does not have a well defined rift zone on it's flanks. Cross-sections through these features show a convex-up profile typical of shield volcanoes elsewhere in the solar system (figure 2). Particularly striking is the similarity to the vaguely sinusoidal profiles of the large Tharsis shields on Mars, even though the venusian shields are considerably shorter (~15-20 km) (Carr,1981).

Calderas appear to be poorly expressed, but it is not clear if this is due to burial by volcanic material or lack of collapse. The caldera at Renpet Mons is quite prominent on its western radar-facing side, and appears to be breached to the south. Unfortunately the altimeter footprint is too large to permit us to see any caldera depression that may be present.

Many small domes are present on the flanks of the shields, but they do not appear to be associated with rift zones as in Hawaii or Arsia Mons. Many lava flows can be mapped on the flanks of these three shields. At low elevations they have irregular and diffuse boundries, and appear to be similar to sheet flows observed to occur on the lower flanks of Arsia Mons, Mars. At higher elevations the flows are more well defined and can be mapped more completely. The mapped flows are in general about 20 km wide and 200 km in length. The size of these units make it possible that these are multiple-flow units associated with a single eruptive episode as suggested by Senske and Head (1988) for Eisila Regio. Some flows appear to start on the volcano's flanks some distance from the summit. These could

either be flank eruptions or indicative of the transition zone between pahoehoe and aa lavas. The signal to noise ratio and the 1-2 km resolution make this distinction difficult. The lack of any radial rift or concentric fractures however, would seem to argue for the later.

Conclusions

Several lines of evidence point to these features being large shield volcanoes, including their topographic profiles, the presence of calderas, their radial texture, and the lack of tectonic elements of the type that are present at Metis, Beta, and Bell Regiones. These elements probably represent some type of tectonic uplift rather than constructional activity. Study of these features is continuing using PV and Venera data, and Magellan images when they become available. Results will be used to develop histories of individual shields which may in turn tell us about the thermal evolution the the venusian lithosphere.

REFERENCES:Campbell et al. (1984) *Science* **226**, 167-170; Head and Wilson (1986) *J. Geophys. Res.* **91**, 9407-9446;Magee and Head (1988) *Lunar Planet. Sci.* **XIX**, 713-714; Senske and Head (1988) *Lunar Planet. Sci.* **XIX**, 1061-1062;Carr, M. (1981) *The Surface of Mars.*

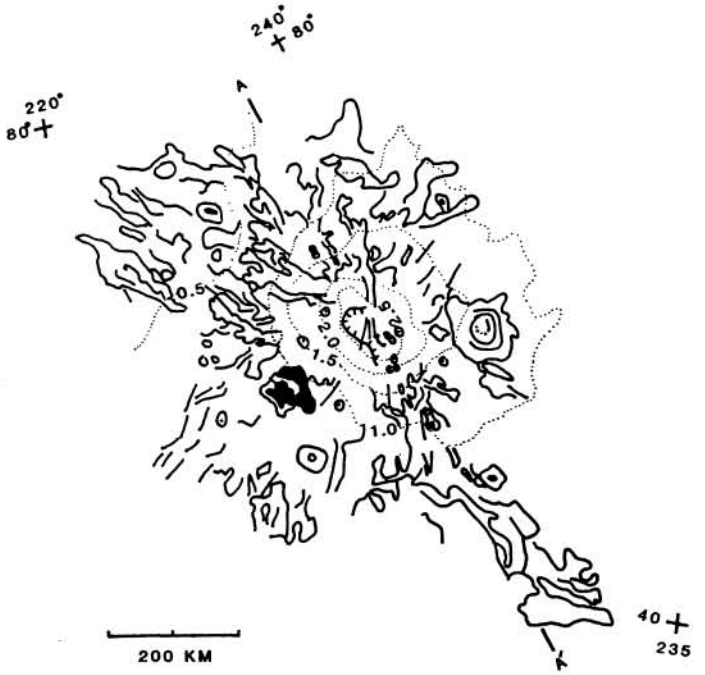

FIGURE 1A

FIGURE 1B

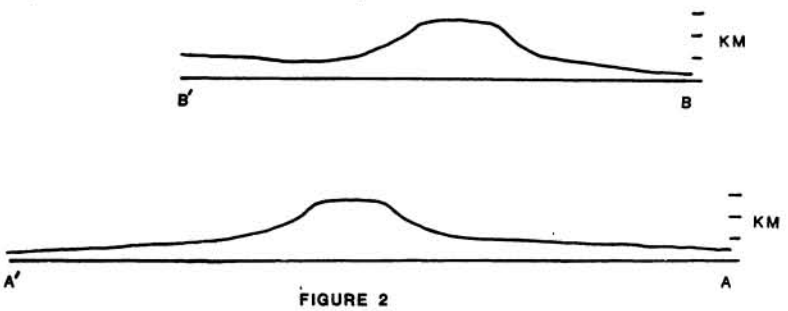

FIGURE 2