see also Figure 1 of *Smrekar and Phillips* [1988]). This basic deformational pattern is observed in proposed examples of gravity sliding such as the Olympus Mons aureole on Mars [*Francis and Wadge*, 1983]. Subsidiary tectonic features might include strike-slip faults that parallel the direction of motion of the wedge and accommodate lateral variations in the rate of downslope movement, as suggested for Laima Tessera [*Kozak and Schaber*, 1986] or the Olympus Mons aureole [*Francis and Wadge*, 1983; *Carras*, 1987].

Some of the steepest topographic slopes on Venus are found surrounding Lakshmi Planum [*Sharpton and Head*, 1985], and therefore gravity sliding is more likely to occur in this region than in most areas. We have examined a feature that lies to the southwest of Lakshmi (Figure 10) and which may be an example of gravity sliding on Venus. Although mapped as tessera terrain [*Barsukov et al.*, 1986] and named Moira Tessera, the feature does not correspond to any of the three types of tessera described here, nor is more than one distinct set of structures present within most of the feature. Venera images show a series of slope-normal fractures and a structurally complex lobate region that lies at the distal portions of the feature, away from Lakshmi (Figure 10*a*). A map of topography and structures (Figure 10*b*) shows that the lobate region forms a southwest facing slope, while the fractures lie at relatively higher elevations, on a gentle northeast facing slope. Ridges and troughs within the lobe tend to be relatively short and are often quite small, near the 1-2 km resolution of the Venera radar. The complex lobate region is similar to the outer surround of some coronae, particularly Nightingale Corona [*Barsukov et al.*, 1986]. These lobate regions and associated ridges are thought to be compressional features [*Stofan and Head*, 1990], but it is not posiible to rule out an extensional origin for the features in Moira. We suggest a possible interpretion of this feature as an example of gravity sliding of material away from the steep southern slope of Vesta Rupes. A topographic profile and interpretational cross section are shown in Figure 11. In the context of gravity sliding, the lobe is due to compressional deformation at the toe of the wedge, while fractures are the result of extension in the upslope region. This deformation occurred as material moved down and away from the surface of Lakshmi Planum.

If Moira "Tessera" (Figure 10) represents a typical example of gravity sliding on Venus, then it is clear that most tesserae did not form due to this process. However, if gravity sliding were to modify an already deformed terrain, a more complex appearance might be expected (e.g., additional tectonic trends and structures not associated with gravity sliding). We therefore consider potential example of gravity-sliding modification to be regions exhibiting extensional deformation at high elevations, with parallel compressional features at lower elevations.

Trough and ridge terrain (T_{tr}) could represent the upper portion of a gravity slide, if lower elevation compressional features were found to strike parallel to either the long trough structures or the discontinuous ridge and trough structures (Figure 4). The only potential example of such a pattern is found along the eastern boundary of Laima Tessera, where ridges in Kamari Dorsa lie at lower elevations that the T_{tr} in Laima and might be considered to strike roughly parallel to the troughs there. However, topographic slopes in the tessera trend approximately SSE-NNW, or nearly perpendicular to the direction required for gravity sliding to form ridges in Kamari Dorsa. Moreover, ridges in Kamari Dorsa clearly crosscut both sets of tessera structures, suggesting that troughs in Laima and ridges in Kamari Dorsa were formed at different times by distinct processes.

Like trough and ridge terrain, most regions of T_{sr} and T_{ds} do not exhibit the structural pattern expected for gravity sliding, even taking into account that such a pattern might be superposed onto or convolved with preexisiting structures. Most regions T_{sr} are found surrounding the mountain ranges in western Ishtar Terra [*Bindschadler*, 1990] and lie downslope of compressional mountain ranges such as Akna, Freyja, and Maxwell montes [*Pronin*, 1986; *Crumpler et al.*, 1986], not extensional features. Most regions of T_{ds} are not consistent with the structural pattern predicted for gravity sliding, with the exception of the western and eastern boundaries of Tellus Regio. However, examination of topography and structures in eastern Tellus (described below) leads us to favor relaxation as the dominant mode of gravity-driven modification of tessera. Thus, although gravity sliding may occur on Venus, it does not appear to dominate the formation or modification of tessera terrain.

Gravitational relaxation. Relaxation is potentially significant in the high-temperature Venus environment [*Weertman*, 1979], particularly for regions of relatively thick crust, consistent with gravity and topography of tesserae. A region of thick crust is subject to horizontal gradients in vertical normal stresses, which can lead to flow of crustal material away from the region, and surface deformation [*Ramberg*, 1968; *Artyushkov*, 1973; *Banerdt*, 1986]. Quantitative relaxation models show that significant horizontal strain (deformation) of surface materials can occur subsequent to creation of topography. In particular, for compensated topography, relaxation results in extension within the interior of a high region and possible compression at lower elevations around the periphery of the region, subject to regional stress fields [*Bindschadler*, 1990; D.L.

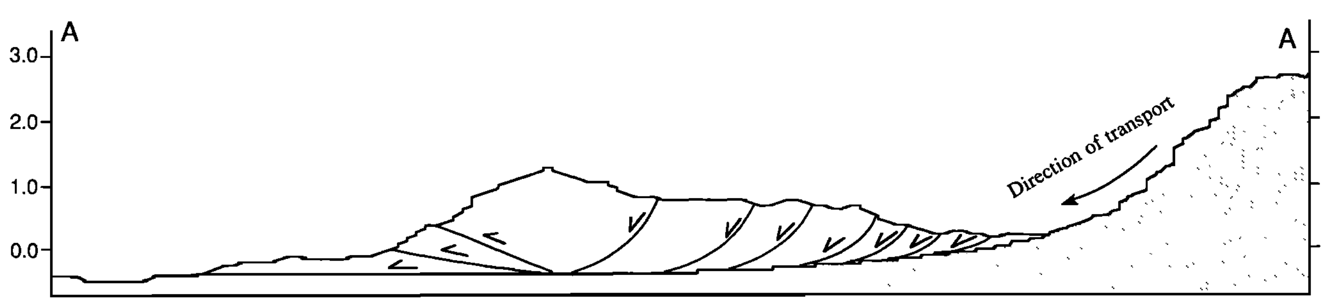

Fig. 11. Topographic profile and structural interpretation of possible gravity slide. Profile is taken from Pioneer Venus topography data. Horizontal scale is the same as Figure 10. Stippled pattern represents the region beneath the hypothesized decollement surface.