(T_{ds}). A seafloor spreading analogy can explain a number of the characteristics of the trough and ridge terrain, but there also appear to be differences between the structure of T_{tr} and that of the terrestrial seafloor. More detailed examination of Venera and Magellan data will be required to establish the process(es) that have formed trough and ridge terrain.

CHARACTERISTICS OF TESSERA TERRAIN

Tessera terrain is found in at least three large regions, each at least 1000 km in its smallest dimension, and numerous smaller regions, typically < 500 km in their largest dimension [*Barsukov et al.*, 1986; *Barsukov and Basilevsky*, 1986]. The three large regions are Fortuna Tessera, Laima Tessera, and Tellus Regio (Figure 1). Numerous smaller tesserae are located near these three regions. Most tessera terrain is found between 0°E and 140°E longitude, although a number of small regions are located to the west, bordering Akna, Freyja, and Danu montes, which themselves surround Lakshmi Planum. Surface properties inferred from PV data were used to predict the locations of tessera terrain south of Venera coverage [*Kreslavsky et al.*, 1988; *Bindschadler et al.*, 1990*a*]. Evaluation of that prediction using a variety of radar data, including recent Arecibo images [*Campbell et al.*, 1989] suggests that tessera terrain is widely distributed throughout the equatorial and southern regions of Venus [*Bindschadler et al.*, 1990*a*].

Regions of tessera terrain appear similar in Pioneer Venus (PV) data but are characterized by diverse appearances in Venera 15/16 images. We find that this diversity can be characterized in terms of three major terrain types, each representing a particular style and sequence of deformation. These and other morphologic characteristics of tessera terrain can be used to evaluate the various formational and modificational model for the tessera terrain.

Topography and Radar Properties

Regions of tessera are among the most distinctive of the Venera units in terms of elevation and PV surface radar properties [*Bindschadler and Head*, 1988*a*, 1989]. Elevations within tesserae typically range from 1 to 3 km above the mean planetary radius (6051.9 km), with an average near 2 km [*Bindschadler and Head*, 1989]. Almost all tesserae lie at higher elevations than surrounding units (typically plains), even relatively small regions such as Ananke Tessera (~50°N, 135°E). Tesserae commonly have relatively steep boundaries and somewhat lower relief in the interior, resulting in a characteristic plateau shape. In other cases, the boundary between plains and tessera terrain is less topographically distinct [*Sukhanov*, 1986]. Measurements of surface properties by the PV orbiter [*Pettengill et al.*, 1980, 1982, 1988] indicate that the surface is extremely rough at scales ranging from 5 cm up to 10 m [*Bindschadler and Head*, 1988*a*, 1989]. Such surface roughness is strongly associated with tectonic units mapped from Venera 15/16 data and is thought to be related to tectonic deformation [*Bindschadler and Head*, 1988*a*, 1989].

LOS Gravity

Another important source of data is line of sight (LOS) gravity data obtained from Doppler radio tracking of the PV spacecraft [*Sjogren et al.*, 1983]. Because of limitations related to spacecraft altitude, maps of LOS anomalies are restricted to the region between approximately 20°S and 50°N latitude. Three large tesserae lie at least partly within this equatorial band: Tellus Regio, Laima Tessera, and Alpha Regio. All three regions are characterized by anomalies of less than 5 mGal [*Sjogren et al.*, 1983], despite the fact that elevations within these regions are principally greater than 1 km above surrounding terrain. This is in distinct contrast to the larger gravity anomalies observed over topographic highs such as Beta, Atla, Eistla, and Bell regiones, and also contrasts with the often-cited positive correlation of gravity and topography for Venus [e.g., *Phillips and Malin*, 1983]. In particular, Tellus Regio exhibits a very low correlation between gravity and topography in comparison to regions such as Beta and Atla [*Sjogren et al.*, 1983]. These characteristics suggest the possibility of fundamental differences in mechanisms of compensation between tessera terrain and regions such as Bell, Beta, and Atla regiones. A recent comparison of geoid-topography ratios (GTRs) for topographic features showed that proposed hotspots (e.g., Beta, Bell) and known and predicted tessera [*Bindschadler et al.*, 1990*a*] formed largely distinct groups in terms of GTR and characteristic wavelength or size [*Smrekar and Phillips*, 1990]. Tesserae were characterized by smaller values of GTR than proposed hotspots. Thus the gravity and topography of tesserae are most consistent with compensation due to crustal thickness variations or to shallow mantle/lithospheric processes.

Types of Tessera

Tessera terrain was first defined from its appearance in Venera 15/16 radar images to consist of orthogonal to obliquely oriented intersecting sets of ridges and troughs [*Basilevsky et al.*, 1986] (Figure 2). However, regions that fit this broad definition are diverse [*Sukhanov*, 1986]; in some cases, different morphologies can be seen within a single region of tessera. Examining Venera images of the three large regions of tessera (Figure 1), we define three types of tessera on the basis of a characteristic morphology, consisting of ridges, troughs, grooves, and lineations, their continuity, and angular and crosscutting relationships. Interpreting these morphologic elements as tectonic structures, we suggest that each type of tessera reflects a particular style and sequence of deformation. These types of tessera thus represent important constraints on models for formation and evolution of the terrain.

Subparallel ridged terrain. This terrain type is characterized by the presence of numerous subparallel ridges and troughs and cross-strike lineations. The type area for subparallel ridged terrain (T_{sr}) is located to the east of Maxwell Montes, in Fortuna Tessera (Figure 3*a*). Subparallel ridged terrain is also found in western Tellus Regio and in Atropos Tessera, adjacent to the western edges of the banded terrain in Akna Montes. Although similar in morphology to the banded terrain, T_{sr} is distinguished by the presence of abundant lineations which disrupt ridge trends.

The most prominent structures in the T_{sr} are subparallel ridges, which strike approximately N-S to NE-SW in the type area (Figure 3*b*). Ridge spacings are typically 10-15 km, and most ridges are continuous for over 50 km along strike. Major ridges are typically continuous for up to 150 km. In addition to ridge structures, T_{sr} contains numerous lineations. These are defined by discontinuities in the subparallel ridges and by a few distinct trough or ridge structures (Figure 3*b*) oriented approximately N60°E and N60°W and are typically continuous