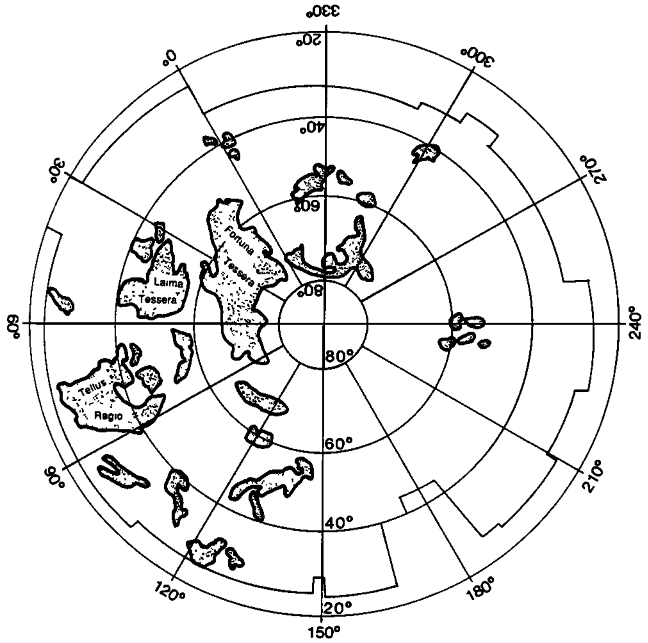

Fig. 1. Distribution of tessera terrain, adapted from the work of *Barsukov et al.* [1986]. The outlined region is the full extent of Venera 15/16 data. From north to south in the 0°E-90°E quadrant, the three large regions of tessera terrain are Fortuna Tessera, Laima Tessera, and Tellus Regio. For reference, Maxwell Montes is centered on 65°N, 5°E, and western Aphrodite Terra lies between ~60°E and 150°E longitude.

cases appears to lie at a higher elevation than surrounding plains. Given this pervasive topographic relationship, we describe and evaluate two sets of models: formational models and modificational models. In the first set we treat the formation of an elevated, deformed region and consider horizontal convergence, mantle upwelling, crustal underplating, and a process analogous to seafloor spreading as possible models. In the second set we consider the structural and tectonic consequences of gravity on a region of high topography. The first of these (gravity sliding) considers thin-skinned deformation of the upper crust caused by topographic gradients. The second (gravitational relaxation) considers the deformation of the entire crust that can result from relief along both the surface and the crust-mantle boundary.

Using modificational models, we consider the possibility that tessera terrain evolves over time; that structures formed by formational processes may be altered or crosscut by structures formed during modification. A simple example is a two-stage model, for example, convergence and crustal thickening followed in time by gravitational relaxation and extension of the resulting region of high topography. In more complex examples the two processes may act at the same time in different parts of a region of tessera terrain.

Formational and modificational models are evaluated by comparing their predictions to observed characteristics of tesserae. Because of the diverse structure and morphology of tessera terrain, we address its dominant characteristics and thus the processes which dominate its formation and evolution. Thus models which are not favored as dominant processes for tessera formation/modification still might have operated in a small region or regions of tessera terrain. Of the six models, we find that three are unlikely to dominate formation/modification of tessera terrain: mantle upwelling, crustal underplating, and gravity sliding. Of the remaining three, horizontal convergence best explains the subparallel ridged terrain (T_{sr}), and continued convergence, in some cases followed by gravitational relaxation, best explains the disrupted terrain

Fig. 2. Venera data from central Tellus Regio, representing the typical complexity of tessera terrain structures. Image is centered on 34.5° N, 80° E and is 550 km E-W by 350 km N-S. The radar look azimuth in this and all subsequent images is approximately westward. Thus bright slopes are eastward facing (radar facing) and dark slopes are westward facing (away facing). The diffuse vertical stripes are an artifact of computer mosaicking and can be seen to varying degrees in most Venera images.