SOME TESSERA ON VENUS MAY BE GEOLOGICALLY YOUNG.

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Tesserae as Ancient: Tesserae on Venus are tectonically complex, radar-bright units comprising ~7% of the planet's surface [1]. Widespread evidence of embayment of tessera margins by younger, radar-dark volcanic plains, together with the extensive deformation that characterizes this terrane, has led to the view that tesserae are the oldest preserved units on Venus [1–3].

(Some) Tesserae as Young: In contrast with this view, we note several areas on Venus where the narrative of tesserae as ancient is challenged. In those areas, lowland plains show progressively greater shortening deformation with proximity to the margins of higher-standing tesserae, such that the structures formed in the plains become indistinguishable from the dominant tectonic fabric of the tesserae themselves.

For example, at the boundary between Sogolon Planitia and Aphrodite Terra at 3°N, 112°E, laterally extensive anticlinal folds strike north–northeast, and smaller folds throughout the plains have that same overall trend (**Figure 1**). At the interface with Aphrodite Terra, the folded plains assume the morphological and radar characteristics of the tessera without any distinct boundary; the north–northeast strikes of the folds match a generally parallel fabric within the tessera, especially at 4°N, 113°E. We have identified similar plains–tessera transitions along Nayunuwi Montes at 4°N, 87°E; at 4°S, 119°E, along the northern margin of Thetis Regio [4]; and along the Semuni Dorsa–Ishtar Terra boundary at 70°–75°N, 5°E.

Implications and Outlook: We interpret these transitions as marking the accommodation of regional shortening along plains–tessera boundaries, by forming structures similar in style and geometry to those inboard of the tessera margins—in effect expanding the area of terrain with tessera characteristics. The incorporation of plains units into tesserae may help balance regional extension elsewhere, such as along major rift zones [1].

Both the lateral growth of tesserae and the horizontal motions of discrete crustal blocks in the lowlands [5] are likely manifestations of the response of the thin and buoyant Venus lithosphere to mantle convective tractions—in marked contrast to the large, mechanically strong tectonic plates and widespread subduction on modern Earth. Geologically young deformation along a number of tessera margins suggests that a major reassessment of Venus' geological history—and level of current activity— is needed.

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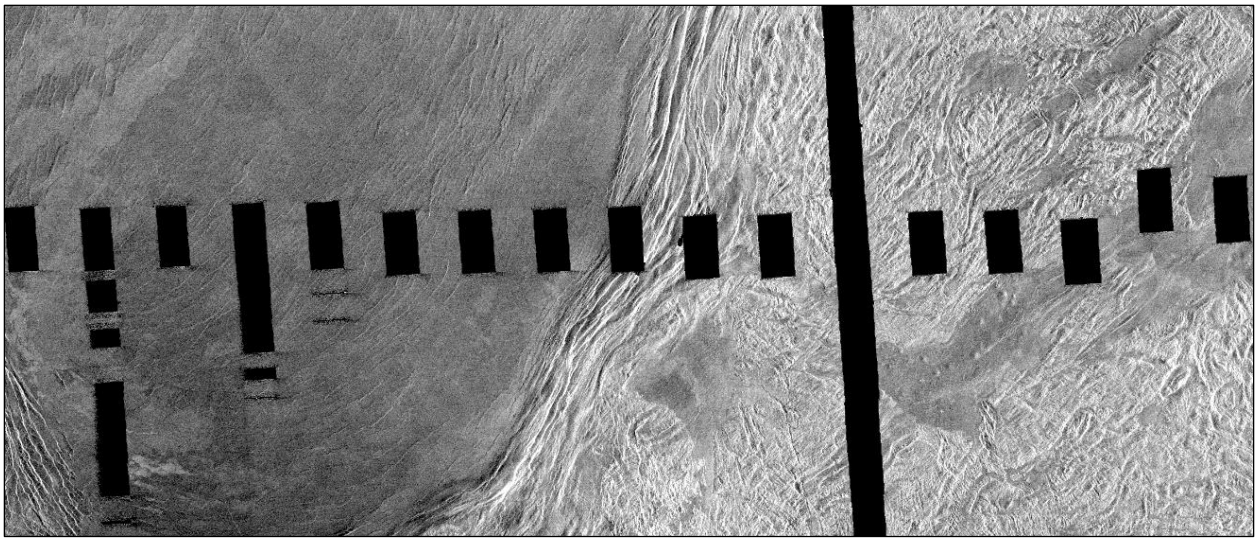

Figure 1. Plains morphologically transitioning into tessera terrain, here along the interface between Sogolon Planitia (left) and Aphrodite Terra (right). The image (in equirectangular projection) shows an area 800 km across, centered at 4°N, 113°E. The black polygons are data gores in the Magellan radar data; the radar look direction is from the left.