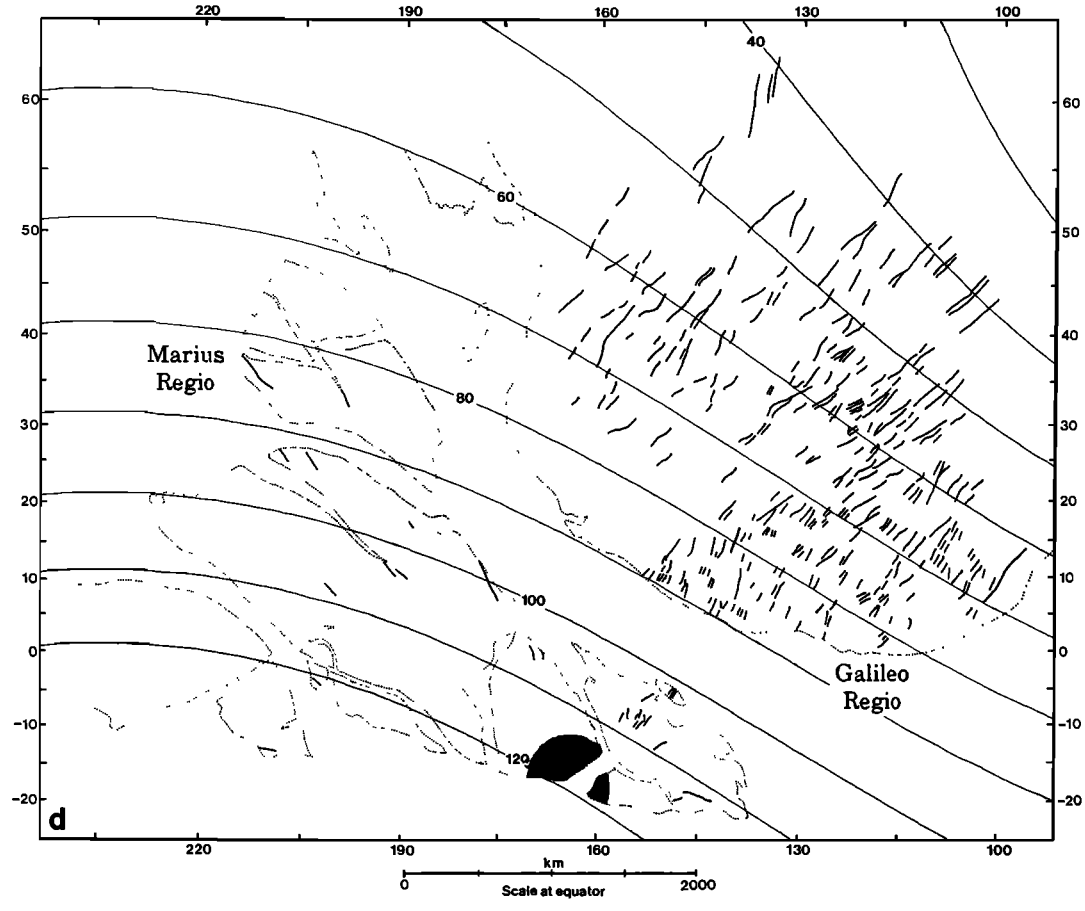


Fig. 16. (continued)

control of furrow orientations by older, approximately concentric system III structures?

Neither of these questions can be answered compellingly in the affirmative. First, in the observed configuration the "radial" furrows in Galileo Regio are oriented 15°-30° clockwise from orthogonal to small circles centered on the center of curvature of system III. Such an arrangement is not suggestive of reuse of the older radial structures. This compares to the nearly orthogonal orientation in the "restored" configuration, which is consistent with reuse of the older radial structures. Second, in the observed configuration nonconcentric arcuate furrows cover about 3 x $10^6$ $km^2$ of western Galileo Regio, twice the area covered by nonconcentric furrows in the "restored" configuration. Within this large area of nonconcentricity in the observed configuration, arcuate furrows in central Galileo Regio do align with small circles centered on the system III center of curvature. However, arcuate furrows in southwestern and westernmost Galileo Regio, which are primarily responsible for the Galileo-Marius misalignment in furrow trends, are oriented 15-25° counterclockwise from the small circles. The latter trend is not good evidence for control of arcuate furrow orientation by older, approximately concentric system III structures.

In summary, in a "restored" configuration most system I arcuate furrows in Galileo Regio are arranged concentrically to the giant palimpsest in southeastern Marius Regio. Nonconcentric furrows in southern Galileo Regio can be accounted for by control by older system III structures, as can the consistent northeast orientation of the system I "radial" furrows in Galileo Regio. In the observed configuration, neither much of the area of nonconcentric arcuate furrows nor the northeast orientation of the "radial" furrows can easily be accounted for in this manner.

*Synthesis of Results and Interpretations*

Separations of poles of concentricity of large areas of system I arcuate furrows led to two hypotheses being posed: (1) that Galileo Regio underwent a small clockwise rotation and was offset left-laterally by 500 km relative to Marius Regio, and (2) that some right-lateral offset of central and southern Marius Regio may have occurred. Between these dark terrain areas are three hemispheric scale grooved terrain structural lineaments that may represent major, reactivated fault and fracture zones. Lineament I separates Galileo Regio and Marius Regio, and appears to follow a small circle trace. At least five independent structural indicators support the hypothesis of 500 km of left-lateral shear along the lineament. Lineament II is a major fracture zone separating northern and central Marius Regio and has a geometry consistent with its being the southern boundary of a zone of minor, distributed left-lateral shear. The region between lineaments I and II includes northern Marius Regio, Elam Sulci, and Uruk Sulcus, and shows evidence of pervasive deformation, minor left-lateral strike-slip offsets, and minor counterclockwise block rotations, consistent with the shear hypothesis. Lineament III separates central and southern Marius Regio and has a geometry consistent with its being a zone of minor right lateral shear. This hypothesis is supported by pervasive deformation and offsets of distinctive structures along the lineament. Total motion along the latter shear zone may have been 40-100 km. Reticulate terrain occurs essentially exclu-