Lineations that are not recognized as topographic relief are most likely to be confused with imaging artifacts, but such lineations commonly represent the only data available in sufficient quantity for statistical treatment. Realization of and proper allowance for this problem are prerequisites for any study of planetary lineation systems from terrestrial satellites, such as ERTS 1, and space probes, such as the 1973 Mariner–Venus/Mercury, that have digital imaging systems.

Combinations of data from Mariner 6 according to regions defined by photometric boundaries reveal similar orientations of lineations at approximately 14° and 28° spacings for Meridiani Sinus and Margaritifer Sinus (plus Eos). This system is interpreted as conjugate shear fractures related to the formation of the canyon in the region of Eos. Such a conclusion is consistent with an independent study of crustal fractures identified in the chaotic terrain from Mariner 6 frames 6N06, 6N07, 6N08, and 6N14, which include the Margaritifer Sinus and Eos areas [*Wilson et al.*, 1973]. Deucalionis Regio (plus Aram) displays a more complex distribution of lineation trends that reflects a more complex or better-preserved geologic history. The regions included in Mariner 6 imagery commonly are bordered by numerous rilles. Consequently, it is suggested that such boundaries in the restricted areas of this study have physiographic and perhaps tectonic, as well as photometric, importance. Preliminary examination of Mariner 9 imagery supports these results.

This study does not confirm or deny the possibility of a global lineament system as suggested by *Binder and McCarthy* [1972]. It does indicate, however, the complexity of the Martian crust on a regional scale that can mask or destroy such a planetwide system. In addition, inferences made from uncategorized lineations can produce spurious results from either imaging artifacts or nonstructural surface features, such as wind-produced streaks.

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