cludes two possibly related trends near N48°E and N60°E, both of which are absent in Meridiani Sinus. Deucalionis Regio exhibits a prominent trend at N61°E but lacks the trend at N56°W found in the other two provinces.

Autocorrelation and autopower functions of the frequency-azimuth distributions from individual rectified frames generally reveal peaks at lags corresponding to 15° ± 4° for *w*3-*w*2 lineations and to both 15° ± 5° and 28° ± 2° for *w*1 lineations. Combinations of lineations into the three photometric provinces provide larger samples and, consequently, more reliable data for this type of analysis. These groupings also produce azimuthal harmonics at 15° ± 2° for *w*3-*w*2 lineations and at 15° ± 2° as well as 28° ± 2° for *w*1 lineations. Visual inspection of the frequency-azimuth distributions (Figure 5) confirms these intervals between trends.

The region northeast of Hellas (frame 7N23) includes prominent N50°E, N37°E, and N21°E trends (*w*3-*w*2 lineations) with a relatively minor N70°W trend. Closer to the eastern rim of Hellas (frame 7N25), however, N00°E and N15°E trends are dominant. The N37°E trend in frame 7N23 and the N15°E trend in frame 7N25 are approximately concentric with the Hellas basin at their respective distances and orientations from the rim. Radially directed lineations from Hellas occur only in the *w*2 and *w*1 lineations and are subordinate to the concentric system.

Discussion

Figure 9 summarizes the trends recognized from lineations and straight-wall segments (Figures 5 and 6) that have been grouped into the three photometric provinces. For comparison, trends recognized by *Binder and McCarthy* [1972] are included. The approach and goals of the study presented here, however, are different from those of Binder and McCarthy. Their independent study combined lineations and wall segments; moreover, it did not separate lineations with topographic expression from lineations without resolvable topographic expression. Finally, only in the region of Meridiani Sinus were their data grouped into a photometric province. An additional but cautious comparison can be made between their data from high-resolution images of the chaotic terrain and our data from Margaritifer Sinus. Furthermore, lineations mapped from the region along latitude −15° in their analysis approximately correspond to Deucalionis Regio.

Three differences in the results of these independent studies emerge (Figure 9). First, Binder and McCarthy recognized an east-west trend in the chaotic terrain and a prominent north-south trend in Meridiani Sinus, both of which do not have corresponding major trends for the *w*3-*w*2 lineations in Margaritifer Sinus and Meridiani Sinus, respectively. These trends do match prominent trends found by us for *w*1 lineations in the respective provinces. Second, although the three trends noted by Binder and McCarthy at latitude −15° match trends in Deucalionis Regio from our data (*w*3-*w*2 lineations), these trends are minor with respect to peaks between N25°W and N05°E found in our data. This latter north-south trend, however, is revealed in the rose diagrams of Binder and McCarthy from high-resolution images. Third, the rose diagrams in our study typically are much more complex, in part a result of using the running mean to group our data rather than placing trends into 10° azimuth slots. Thus the differences between their results and our results are believed to reflect differences in the treatment of data.

Lineations are identified as a variety of topographic forms. Positive relief lineations include ridges analogous to lunar wrinkle ridges, ejecta, scarps, and remnants of craters. Negative relief lineations include grabenlike nonsinuous rilles, rectilinear rilles, curvilinear rilles, and coalesced craters. Several crater rim areas exhibit curvilinear rilles that converge toward a common area from the rim crest. These are interpreted as drainage features rather than ejecta or structurally produced rilles. The existence of such rilles is confirmed from Mariner 9 imagery (see M9-4219-51).

Clearly, the structural significance of preferred trends of lineations requires the elimination of both electronic imaging noise and nonstructurally produced forms, such as crater ejecta, topographically controlled drainage features, lineations on crater floors, and wind-produced forms. In addition, nonlinear features can be misinterpreted as lineations owing to poor resolution and the effects of solar illumination.

Removal of possibly nonstructural lineations from the highest-weighted set did not alter