



Fig. 5b. An enlarged section of Figure 5a, showing a trough of ~30 km width. At smaller scales, low-relief struc-

tures and uplifted horst blocks parallel this canyon system. Scale bar is 50 km (VO 94A30).

quence of Tharsis lava flows, where nearly continuous volcanic activity constrained individual feature formation to relatively narrow time intervals. Outside volcanic provinces, however, the infrequent emplacement of geologic surface units precludes useful time constraints on tectonic activity. The vastly increased intervals between emplacement events in the cratered uplands only provide broad time frames for activity, and superposition relations are unable to yield precise dates for structure formation [Plescia and Saunders, 1982].

Without a means to indirectly obtain precise feature ages, an alternative approach is required to directly obtain areal crater numbers for linear systems. Tanaka [1982] derived one such method for dating narrow, elongate features by craters of greater radius than feature width. A modification of this technique (see the appendix) applies to strictly linear features (i.e., features assumed to have no

width). The validity of this dating method has been tested by several means and correlates well with areal crater densities. For the first test, arbitrary line segments were mapped onto Lunae Planum, Chryse Planitia, Syrtis Major Planum, and Hesperia Planum. These model scarp systems were then dated by the "linear" technique and the resulting N/A value compared to the areal crater counts of the same regions (Figure 7). The linear values show a 1:1 correspondence with the observed areal crater numbers. As a second test, units stratigraphically bracketing linear tectonic systems (H1, I-AF, H2) around Isidis and Hellas were dated (Figure 8). Again, there is good agreement between the relative ages of the linear systems and the bracketing stratigraphic units. As a further example, the derived structure ages of this study are consistent with the observed flooding of massif ring graben by both rim planum units.