



Fig. 6. The eastern part of the volcanic cone field north of Amenthes Fossae (VO 878A38). Arrows indicate a few

characteristic breached cone structures. Scale bar is 20 km.

Figure 9 summarizes the derived relative ages for the tectonic systems and volcanic units associated with Isidis and Hellas. Because relative ages are determined from the craters superposing a given feature or unit, they do not directly address the time of initiation or duration of activity; only the time of most recent activity can be determined. Nevertheless, several distinct phases of terminal activity emerge from these sequences. First, the distant-concentric canyons formed around Hellas immediately after basin formation and a distinct hiatus in dated tectonic activity ensues around Hellas until development of the graben in the Hellespontes Montes (HMG). Troughs radial to Isidis clearly postdate the time of distant canyon formation about Hellas, but predate the final stages of fretted terrain (FT) development nearby. Of special interest is the coincidence in time of final massif ring graben formation with the onset of terminal volcanism in both Isidis and Hellas represented by the overlap of massif ring graben and rim planum ages.

Volcanism around Hellas occurred in two stages of activity. The early period of Malea Planum and Tyrrhena Patera formation approximately coincides

with the end of fretted terrain development near Isidis to the north. The later ages of Hadriaca Patera, Hesperia Planum, and peripheral volcanic plains to the west correspond in time with much of the Isidis volcanism. The relative ages of volcanic units around Isidis are remarkably consistent and indicate a regional termination of volcanism about the time of Lunae Planum formation. A short-lived terminal pulse of activity is further indicated for the Isidis region by the relatively small erupted volumes of the volcanic cones north and east of Isidis and of the plains units in the I-AT radial trough.

These comparisons provide a generalized sequence of basin evolution common to both Isidis and Hellas, as illustrated in Figure 10. Distant-concentric canyon formation preceded the development of radial troughs at large distances from the basin center. After an apparent hiatus, basin-centered tectonism culminated with massif ring graben formation and rim planum volcanism. Basin volcanism is associated with radial troughs (North Amenthes volcanic field, Isidis; Tyrrhena-Hadriaca Paterae, Hellas) but is most extensive near the massif ring graben as expressed by the rim plana. Unfortunately, vol-