

**GEOLOGIC MAPPING OF HARMAKHIS AND REULL VALLES REGION, MARS:
EVIDENCE FOR MULTIPLE RESURFACING AND DRAINAGE EVENTS;
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Numerous mesas and irregular, channel-cut escarpments south of Harmakhis and Reull Valles suggesting at least two resurfacing events with subsequent periods of erosion are revealed from detailed geologic mapping of three adjacent 1:500,000-scale quadrangles (MTM-40262, -40267, -40272). Also, two distinct episodes of surface water runoff, each from different styles of water release, are evident [1]. Geologic mapping is based on 1:500,000-scale photomosaics of the Harmakhis vallis region, and is an outgrowth of preliminary regional geologic mapping on a 1:2,000,000-scale on the east rim of Hellas Basin [2].

Three plains units, formerly mapped together as the Channeled plains rim unit (Ah₅) [4], have been differentiated based on morphology and texture. The oldest unit is Hummocky material (AHh) which displays a mottled appearance and is dissected by numerous channels, some of which are dendritic. The irregular surface of moderate relief is probably volcanic material, and may represent relict topography or reworking of old (or exhumed) surface materials. Probable causes for the irregular surface texture, which may be contemporaneous with unit formation or more recent, include eolian processes (deflation or dunes) or partial collapse of water- or ice-rich deposits.

Superimposed on the AHh is the Smooth plains material unit (AHsp), which shows slight to moderate relief, and which is also etched by narrow, sinuous channels. Escarpments of AHh are incised by channels in places, and in other places form infacing windows on the Hummocky material below. Smooth plains materials are interpreted to have been once more widespread as evidenced by the presumably retreating escarpments which delineate the unit. The third and youngest plains unit is the Mesa materials (AHm). Mesas have irregular outlines, smooth surfaces, range in size from less than one km to approximately 70 km in width, and are found in the southern half of the mapped area. Mesa materials are interpreted as erosional remnants of a once more widespread sedimentary (probably windblown) deposit.

Outflow channels originating south of Hadriaca Patera, appear to have their sources in collapse depressions within 40 km of each other in the highlands of Promethei Terra. Harmakhis extends southwest toward Hellas basin, and Reull extends southeast. Harmakhis transects an older dendritic drainage network (on MTM -40267) whose morphology suggests a water source either from precipitation or from drainage of a large body of water [1]. Portions of the dendritic network show topographic inversion, which are interpreted as the result of several episodes of channeling and infilling of a more resistant material [1,3].

REFERENCES. [1] Price, K.H. (1992) *Lunar Planet. Sci. Conf., XXIII*, 1107. [2] Crown, D.A., Price, K.H. and Greeley, R. (1990) *Lunar Planet. Sci. Conf., XXI*, 252-253. [3] Crown, D.A., Price, K.H. and Greeley, R. (1992) *Icarus*, 100, 1-25. [4] Greeley, R. and Guest, J.E. (1987) *USGS Map I-1802-B*.

