

**CENTRAL CHRYSÉ PLANITIA, MARS: GEOLOGIC UNIT INTERPRETATION FROM 1:500,000-SCALE MAPPING;** Robert A. Craddock<sup>1</sup>, L.S. Crumpler<sup>2</sup>, and Jayne C. Aubele<sup>2</sup>; <sup>1</sup>Center for Earth and Planetary Studies, National Air and Space Museum, Smithsonian Institution, Washington, D.C. 20560; <sup>2</sup>Department of Geological Sciences, Brown University, Providence, R.I. 02912

Central Chryse Planitia represents one of two areas on the martian surface where planetary geologic mapping is added by Viking lander "ground-truth" observations. The broad-scale geology of Chryse Planitia [1] and the geology of the Viking 1 landing site [2] have been previously examined by other investigators. 1:500,000 scale mapping of central Chryse Planitia and the Viking 1 landing site (MTM's 20047 and 25047) was undertaken to synthesize these results and to address the following questions: (1) What is the depositional and erosional history of the Chryse Planitia basin? (2) How representative are the Viking 1 surface materials of the region and of plains units in general? (3) What is the extent of channel materials versus ridged plains materials? (4) As a result of the Viking lander investigations, what are the initial, primary objectives future missions to the surface should address?

Figure 1 shows a generalized 1:500,000-scale geologic map. The oldest materials are Hesperian in age, although degraded and/or buried craters may have formed on underlying Noachian materials. Ridged plains materials (Hr<sub>1</sub>, Hr<sub>2</sub>, and Hr<sub>3</sub>) are the most extensive units portrayed and are characterized by numerous linear to sinuous wrinkle ridges (Xanthe Dorsa). These materials are defined on the basis of relative crater abundances, frequency of ridges, and degree of fluvial modification of the ridges. The ridges are morphologically similar to lunar mare-ridges and are interpreted to be the result of regional compressional strains in a competent, layered surface unit. Unlike lunar mare-ridges, the Xanthe Dorsa ridges trend north-south as opposed to being circumferential to the Chryse basin. This suggests basin subsidence was not the mechanism for Xanthe Dorsa formation as has been suggested for lunar ridges [3]. Despite the high resolution of the available images (<10 m/pixel), primary volcanic features such as flow fronts or vents have not been observed. The depositional nature of ridged plains, unit 3 (Hr<sub>3</sub>) is suggested by the occurrence of several partially buried craters (c<sub>1</sub>) along its southern contact. Using rim height to diameter ratios for martian craters [4], the thickness of this unit is ~300 m. Despite these observations, at the surface no unequivocal depositional features have been identified [2].

Distinct flat-topped and isolated ridges (Hri) occur along the crest of several of the more prominent mare-type ridges in the north-eastern half of the map area. These are interpreted to represent erosional remnants (i.e., inselbergs) of earlier ridges degraded and subsequently re-developed during continued regional deformation, or isolated highs representing buried structures (i.e, kipukas) such as large crater rims. The former suggests that ridge development is geologically long-lived [5] and span intervals of time great enough that several fluvial episodes occurred during the development of a single ridge. The latter interpretation suggests that ridge formation occurs where the ridged plains are thinnest, similar to mare wrinkle ridge development [3]. The incised channel unit (Hchi) and channeled plains materials, units 1 & 2 (Hchp<sub>1</sub> and Hchp<sub>2</sub>) occur east of Kasei and Maja Valles and are superposed on the ridged plains. These materials represent complex episodes of fluvial deposition and erosion.

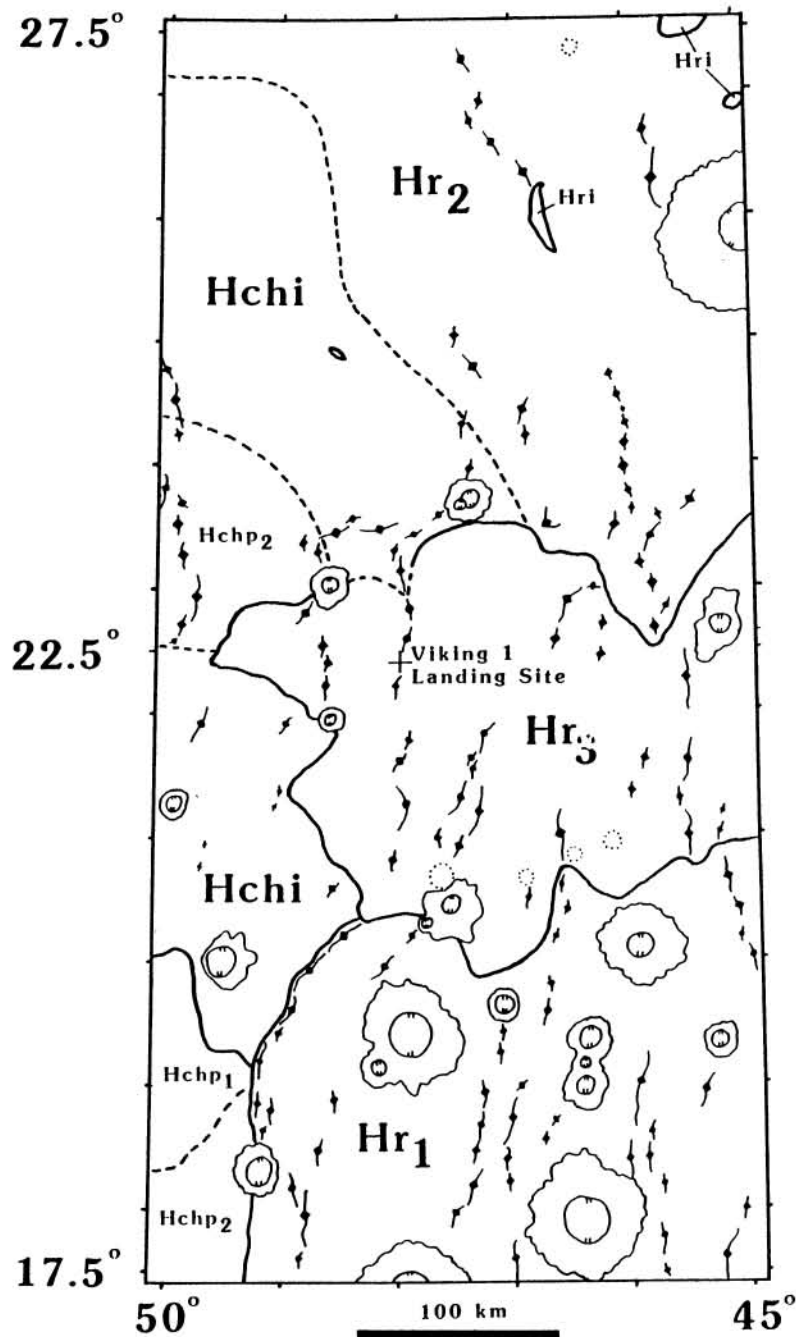


Figure 1. Generalized geologic map of the central Chryse Planitia region and the Viking 1 landing site. See text for explanation of units.

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