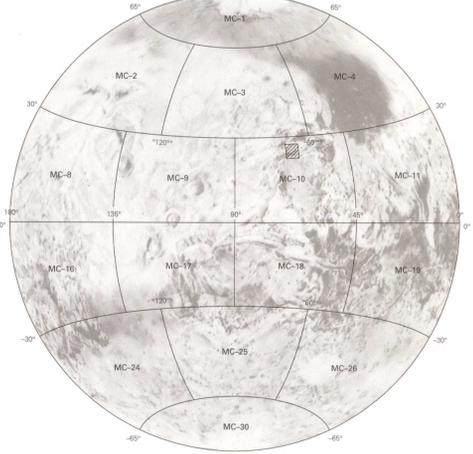


- DESCRIPTION OF MAP UNITS**  
(Cumulative crater densities given in some unit descriptions are for craters with diameters greater than 2 km, not reduced to 10° km<sup>2</sup> relative ages for other units established by stratigraphic relations)
- CHANNEL- AND VALLEY-FLOOR MATERIALS**  
Kasei Valles assemblage  
Materials produced or modified in association with formation of Kasei Valles
- Akps** Smooth plains material—Smooth deposits in lowest areas of Kasei Valles. Varied flow to intermediate albedo. Overlies older apron material in narrow branch channels. Craters rare. Interpretation: Eolian or lacustrine materials.
  - Aka** Younger apron material—Two lobate deposits on lower slope of north edge of Sacra Mensa and on Kasei floor. Lobes emanate from two Sacra Fossae depressions; one lobe contains a sinuous channel (fig. 7). Interpretation: Young debris flows or alluvial fans formed by ground-water sapping of preexisting Sacra Fossae.
  - AHka** Older apron material—Locally forms coalesced aprons along lower slopes of plateaus. Interpretation: Tuffs and alluvial fans formed at base of steep slopes and cliffs by rock falls and material loosened by ground-water or ground-ice sapping.
  - AHkch** Floor material of theater-headed channel—Small, relatively smooth outcrop in southwest corner of map area within theater-headed channel of dendritic network that connects with south Kasei channel west of map area. Channel networks follow trends of crevices that form rectilinear pattern on floor of Kasei Valles (better seen in quadrangle MTM 25072; Chapman and others, 1991). Interpretation: Young fluvial deposit; channel formed by ground-water sapping along preexisting fracture.
  - Hkch2** Younger channeled plains material—Forms widespread, low-lying plains containing streamlined mounds. Marked by north- to northeast-trending longitudinal grooves (Sacra Sulci) that are cut by many crevices forming rectilinear to sinuous patterns. Crater density 730 ± 220. Interpretation: Scoured surface and landforms caused by catastrophic flooding or glacial erosion; unit may include fluvial sediments in places. Crevices are preexisting features enhanced by scour, plucking, and later sapping and mass wasting.
  - Hkd** Degraded plateau material—Rough, knobby, chaotic material on Sacra Mensa adjacent to older channeled plains unit. Interpretation: Material formed by degradation of ridged plains or Noachian plateau material, possibly due to collapse associated with removal of ground ice.
  - Hkch1** Older channeled plains material—Forms moderately rough surfaces on parts of Sacra Mensa; commonly surrounds streamlined mounds of ridged plains material. Contains longitudinal grooves and rectilinear crevices and is cut by Sacra Fossae. Included in ridged plains material by Chapman and others (1991). Moderately cratered; density 950 ± 190. Interpretation: Ridged plains material scoured by catastrophic flooding or glaciation.
- PLATEAU MATERIALS**
- Hr** Ridged plains material—Smooth, marked by north-trending wrinkle ridges; caps Lunae Planum and Sacra and Lunae Mensae. Cut by Kasei Valles and 1- to 6-km-wide linear troughs of Sacra Fossae. Eroded into streamlined mounds at lat 26° N, long 66° on Sacra Mensa. South of map area (Viking image 664A16), unit contains lobate scarps. Moderately cratered; density 1000 ± 200 (Scott and Tanaka, 1986). Interpretation: Resistant basaltic lavas deformed by compressional buckling; scoured on Sacra Mensa.
  - HNw** Resistant material—Thin layer covering terraces and flat-topped, streamlined islands in Kasei Valles. Consistently lies at 1-km depth below nearby plateau surfaces. Interpretation: Cemented rock or lava within wall material; alternatively, may be eroded lava or fluvial gravel deposited on intermediate-level floor of Kasei Valles or resistant layer of ridged plains material.
  - HNw** Wall material—Slopeforming; seen in plateau walls beneath ridged plains material. Layering exposed locally; some crevices partly buried by apron materials. Interpretation: Less resistant than ridged plains unit; perhaps ice-rich and poorly indurated materials of various origins (such as ridged plains lavas or older Noachian materials); layering may indicate strata of varied composition or cementation. See text for further discussion.
- CRATER MATERIALS**  
(Includes all craters larger than 3 km in diameter. All are interpreted to be of impact origin)
- AHc** Material of craters that postdate erosion by Kasei flooding—Bowl-shaped craters have sharp, complete rim crests; steep walls; and deep, rough floors. Ejecta commonly extensive, well preserved; may form rayed patterns. Ejecta superposed on or buried by Amazonian units.
  - Hc** Material of craters that predate erosion by Kasei flooding—Rim crests high and either complete or rounded and incomplete; walls relatively steep; floors may be flat, some lower than adjacent terrain. One central peak observed. Sparse or partly eroded ejecta superposed on Hesperian units and locally on Hesperian-Noachian wall material. Streamlined mounds occur 'downstream' from some craters.
- CONTACTS AND FEATURES**
- Contact—Dashed where approximately located; dotted where concealed
  - Wrinkle ridge—Line marks crest; dashed where approximately located; dotted where buried
  - Lobate scarp—Ticks point downslope; may form contact
  - Scarp—Dashed where approximately located; line marks top of scarp; barb points downslope
  - Narrow channel—Arrows point in inferred direction of flow
  - Crevices—Crevices form rectilinear and sinuous patterns
  - Closed depression
  - Detached blocky lobe—Arrow indicates direction of movement
  - Crater rim crest—Dotted where buried
  - Crater central peak



Base from U.S. Geological Survey (1994)  
Minor errors inherent in this base and in that of MTM 25062 (Sheet 1) result in offsets of physiographic features at the common map border

SCALE 1:502 000 (1 mm = 502 m) AT 70° LONGITUDE  
TRANSVERSE MERCATOR PROJECTION

0 10 20 30 40 50 60 70 80 90 100  
KILOMETERS

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**MTM 25067**  
**GEOLOGIC MAPS OF THE MTM 25062 QUADRANGLE (DIGITAL COMPILATION) AND THE MTM 25067 QUADRANGLE (MANUAL COMPILATION), KASEI VALLES REGION OF MARS**

By  
**Mary G. Chapman and Kenneth L. Tanaka**  
1996