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U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

Prepared for the
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

GEOLOGIC INVESTIGATIONS SERIES I–2805
Version 1.0

Petrotin

Candor Labes

Tithoniae

Catenae

CANDOR

Ceti Mensa

CHASMA

Tithoniae

Fossae

Ius Labes

IUS CHASMA

NORTH

WEST

EAST

SOUTH

SCALE 1:502 000 (1 mm = 502 m) AT 290° E. (70° W.) LONGITUDE
TRANSVERSE MERCATOR PROJECTION

KILOMETERS

CONTOUR INTERVAL 250 METERS

Planetocentric latitude and east longitude coordinate system shown in black.
Planetographic latitude and west longitude coordinate system shown in red.

NOTES ON BASE

This map, compiled photogrammetrically from Viking Orbiter stereo image pairs, is part of a series of topographic maps of areas of special scientific interest on Mars.

ADOPTED FIGURE

The figure of Mars used for the computation of the map projection is an oblate spheroid (flattening of 1/176.875) with an equatorial radius of 3396.0 km and a polar radius of 3376.8 km (Kirk and others, 2000). The datum (the 0-km contour line) for elevations is defined as the equipotential surface (gravitational plus rotational) whose average value at the equator is equal to the mean radius as determined by Mars Orbiter Laser Altimeter (MOLA; Smith and others, 2001).

PROJECTION

The projection is part of a Mars Transverse Mercator (MTM) system with 20° wide zones. For the area covered by this map sheet the central meridian is at 290° E. (70° W.). The scale factor at the central meridian of the zone containing this quadrangle is 0.9960 relative to a nominal scale of 1:500,000.

COORDINATE SYSTEM

Longitude increases to the east and latitude is planetocentric as allowed by IAU/IAG standards (Seidelmann and others, 2002) and in accordance with current NASA and USGS standards (Duxbury and others, 2002). A secondary grid (printed in red) has been added to the map as a reference to the west longitude/planetographic latitude system that is also allowed by IAU/IAG standards (Seidelmann and others, 2002) and has been used for previous Mars maps.

CONTROL

Horizontal and vertical control was established using the Mosaicked Digital Image Model 2.0 (MDIM 2.0; Kirk and others, 2000) and MOLA data. A portion of MDIM 2.0 covering the mapping area was extracted in simple cylindrical projection. This MDIM image was georeferenced to the MOLA data with an affine transformation. The MDIM image and georeferencing information were imported into a digital photogrammetric workstation (Miller and Walker, 1993) and used as an orthophoto to provide horizontal control to stereopairs of Viking imagery. The horizontal information was used to extract vertical control from the MOLA data. Note that the distribution of Viking Orbiter images suitable for mapping at a scale of 1:500,000 is uneven. Areas mapped in this series are chosen, often in blocks of two or more adjacent quadrangles, based on scientific interest as well as on the availability of suitable data for accurate mapping.

CONTOURS

Contours were derived from a digital terrain model (DTM) compiled on a digital photogrammetric workstation using Viking Orbiter stereo image pairs with orientation parameters derived from an analytic aerotriangulation. Contours were drawn automatically using a commercial geographic information system (GIS) software package (Environmental Systems Research Institute, 1994). For the stereomodels, the local expected vertical precision, based on image resolutions, parallax-to-height ratio (that is, convergence angle), and a matching accuracy of 0.2 pixel ranges from 47 m to 199 m, with a mean of 87 m. Elevation (in meters) is given with respect to the adopted Mars topographic datum (see "Adopted Figure" section). A comparison of the DTM values at the MOLA point locations shows that the DTM is on average 6 meters lower than the MOLA points (n=237,864; μ=-6 m; σ=213 m). Contour lines were generated automatically using GIS software and were not edited. Because the contour lines were not edited, small closed contour lines, contour lines that intersect, and contour lines that do not match features are present. The post spacing for the DTM is 600 m; features that are less than 600 m in size will not be resolved and features that are smaller than 1800 m in size may only have four elevation measurements associated with them. This lack of elevation measurements may result in contour lines that do not adequately represent some features. The purpose of this mapping project is to produce the digital orthophoto and DTM. This map provides a graphical representation of the digital products that are available.

IMAGE BASE

The image base for this map employs Viking Orbiter images from orbits 682, 608, 912, and 334. An orthophotomosaic was created on the digital photogrammetric workstation using the DTM compiled from stereo models. Integrated Software for Imagers and Spectrometers (ISIS; Torson and Becker, 1997) provided the software to project the orthophotomosaic into the Transverse Mercator Projection.

NOMENCLATURE

Names on this sheet are approved by the International Astronomical Union (IAU). For a complete list of IAU approved names, see the Gazetteer of Planetary Nomenclature at http://planetarynames.wr.usgs.gov.

MTM 500k –05/282E OMKT: Abbreviation for Mars Transverse Mercator; 1:500,000 series; center of sheet latitude 5° S., longitude 282.5° E. in planetocentric coordinate system (this corresponds to –05/077; latitude 5° S., longitude 77.5° W. in planetographic coordinate system); orthophotomosaic (OM) with color-coded (K) topographic contours and nomenclature (T) [Greeley and Batson, 1990].

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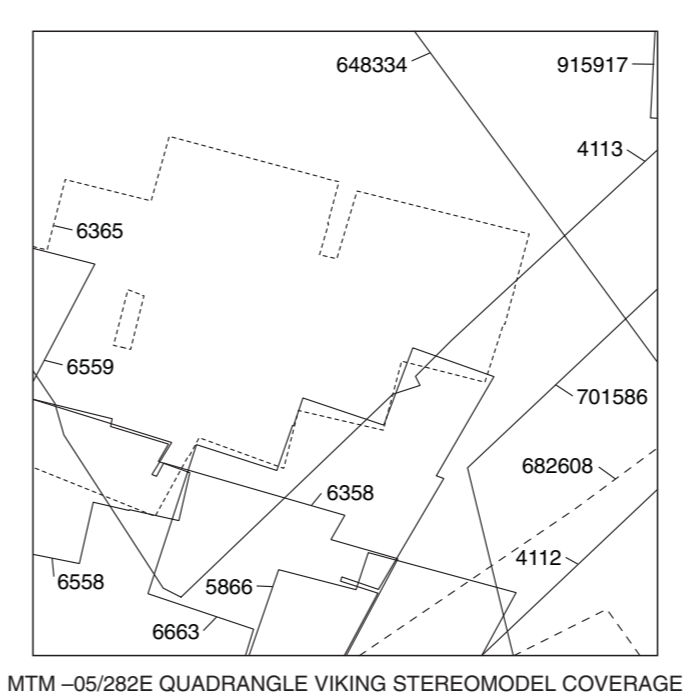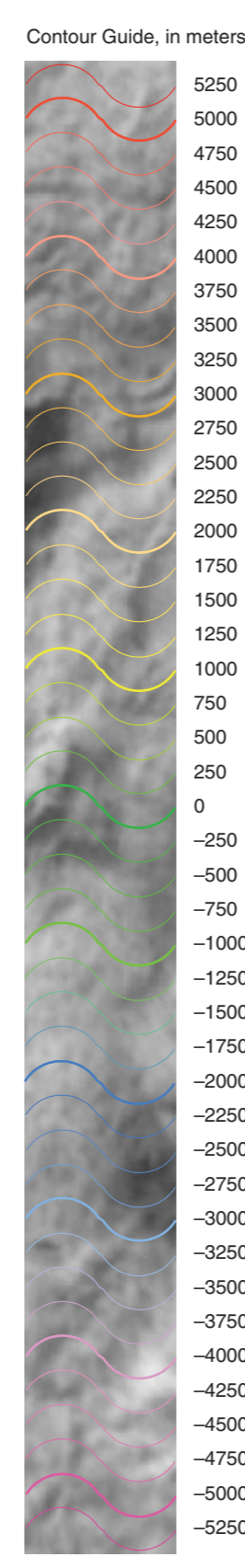
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Contour Guide, in meters

5250
5000
4750
4500
4250
4000
3750
3500
3250
3000
2750
2500
2250
2000
1750
1500
1250
1000
750
500
250
0
-250
-500
-750
-1000
-1250
-1500
-1750
-2000
-2250
-2500
-2750
-3000
-3250
-3500
-3750
-4000
-4250
-4500
-4750
-5000
-5250

MTM –05/282E QUADRANGLE VIKING STEREOMODEL COVERAGE

The following is a list of image pairs used to produce the topographic information for this map. Numbers below correspond to the numbers on the diagram above.

ID	IMAGE PAIR	ID	IMAGE PAIR	ID	IMAGE PAIR
915917	915A10–917A09	6559	915A22–059A25	6358	063A43–058A77
701586	701A30–586A08	6365	063A47–058A27		
682608	682A30–608A72		063A47–062A26		063A44–058A73
	682A29–608A72		063A44–065A26		063A42–058A73
648334	648A10–334A44		063A46–065A24		063A47–058A77
6663	066A20–063A45		063A45–065A27		063A40–058A76
	066A18–063A45		063A45–065A28		
	066A16–063A45		063A45–065A25	5866	058A77–066A17
	066A15–063A43		063A44–065A23		058A76–066A19
6558	065A21–058A73		063A44–065A22	4112	041A30–012A13
	065A21–058A73		063A44–065A21	4113	041A20–013A13
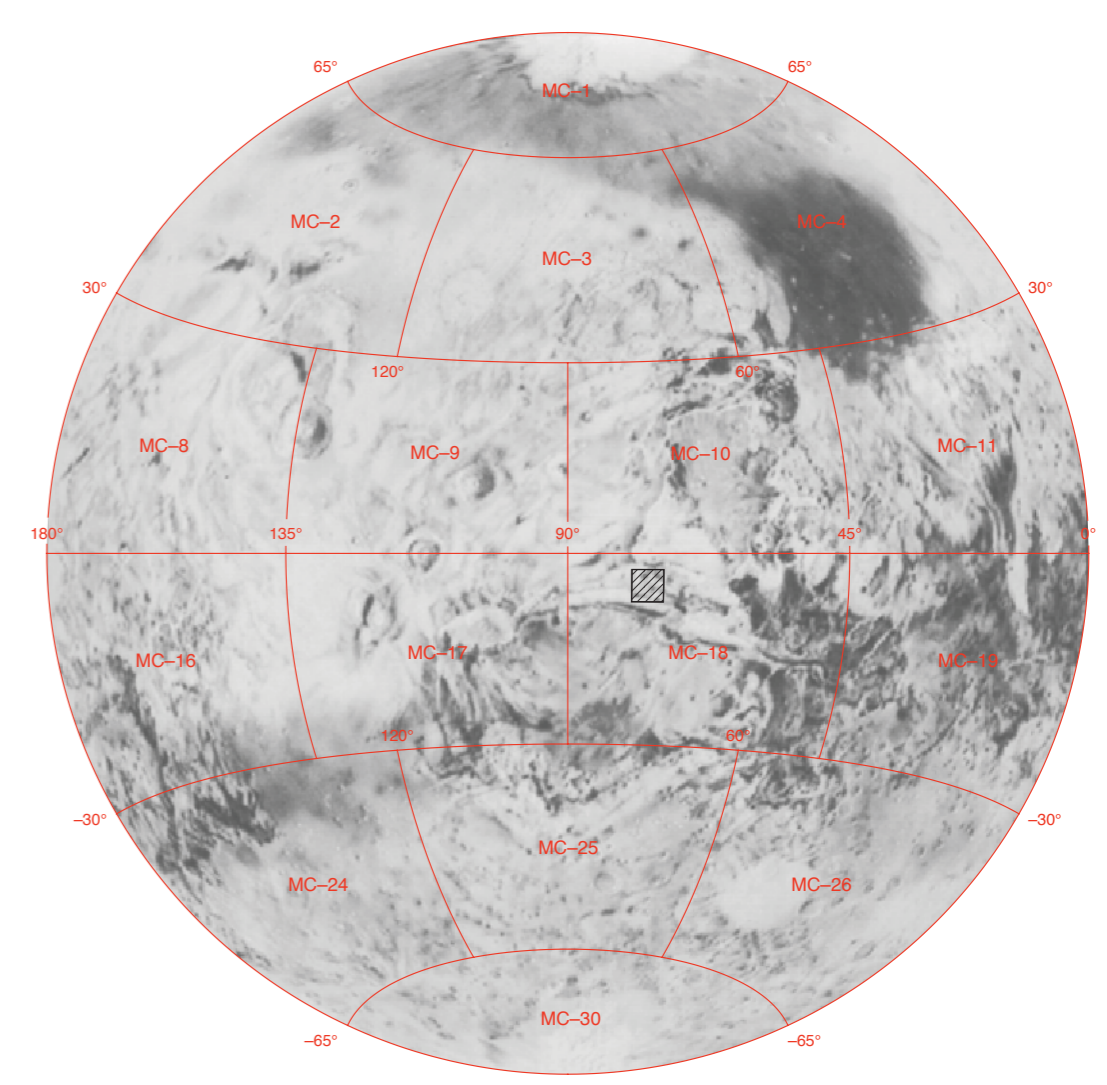
QUADRANGLE LOCATION
Photomosaic showing location of map area. An outline of 1:5,000,000-scale quadrangles is provided for reference.

Topographic Map of the West Candor Chasma Region of Mars
MTM 500k –05/282E OMKT
By
U.S. Geological Survey
2004

125 years of science for America 1879–2004