

NOTES ON BASE

This is one map in a series of topographic map sheets covering the entire surface of Mars at nominal scale of 1:2,500,000 and 1:500,000 (Batson, 1973, 1976). The major sources of map data were the Mariner 9 television experiment (Maursky and others, 1970), and Viking Orbiter pictures.

ADOPTED FIGURE

The figure of Mars used for the computation of the map projection is an oblate spheroid (flattening of 1:192) with an equatorial radius of 3393.4 km and a polar radius of 3252.7 km. This is not the biggest datum, which is defined below under the heading "Contours".

PROJECTION

The Lambert conformal conic projection is used for this sheet with standard parallels at -35° 8' and -59° 2'. A scale of 1:4,336,000 at lat -30° was chosen to match the scale at lat -30° of the adjacent Mercator projection. Longitude increases to the west in accordance with usage of the International Astronomical Union (IAU, 1971). Latitudes are arcographic (de Vasconcelos and others, 1973).

CONTROL

Planimetric control is provided by photogrammetric triangulation using Mariner 9 pictures (Davies, 1973; Davies and Arthur, 1973) and the radio-tracked position of the spacecraft. The first meridian passes through the crater Aiyu-O (lat -5° 19') within the crater Aiyu. No simple statement is possible for the precision, but local consistency is about 10 km.

MAPPING TECHNIQUE

A series of mosaics of Lambert conformal conic projections of Mariner 9 pictures was assembled at 1:5,000,000.

Shaded relief was portrayed with uniform illumination with the sun to the west, using airbrush techniques described by Inge (1973) and Inge and Bridges (1975). Size, shape, and position of features were taken from the base mosaic. Various computer enhancements of many Mariner 9 and Viking Orbiter pictures besides those in the base mosaic were examined in an attempt to portray the surface as accurately as possible. Computer enhancement of Mariner 9 pictures is described by Levinthal and others, 1973, and Green and others, 1975.)

Shaded relief analysis and representation were made by Patricia M. Bridges.

ALBEDO MARKINGS

The markings superimposed on the shaded relief were hand copied from Mariner 9 pictures that were computer enhanced especially to show low-frequency tone variation (Batson and Inge, 1974). The surface in these pictures is illuminated from a variety of angles from the camera line of sight. The markings therefore delineate boundaries of local brightness variations only and should not be considered as a true measure of albedo. No attempt was made to use Earth-based telescopic albedo data.

Airbrush portrayal of albedo markings was done by Patricia M. Bridges.

CONTOURS

Because Mars has no seas and hence no sea level, the datum (the 0 km contour line for altitudes is defined by a gravity field described by spherical harmonics of fourth order and fourth degree (Jordan and Lorell, 1975) combined with a 6.1-milibar atmospheric pressure surface derived from radio-occultation data (Kilore and others, 1973; Christensen, 1975; Wu, 1975, 1978).

The contour lines on most of the Mars maps (Wu, 1975) were compiled from Earth-based radar determinations (Downs and others, 1971; Petrágall and others, 1971) and measurements made by Mariner 9 instruments, including the ultraviolet spectrometer (Hord and others, 1974), infrared interferometer spectrometer (Conrath and others, 1973), and stereoscopic Mariner 9 television pictures (Wu and others, 1973).

Formal analysis of the accuracy of topographic elevations has not been made. The estimated vertical accuracy of each source of data indicates a probable error of 1 km.

COLOR

No attempt was made on the map to duplicate precisely the color of the Martian surface, although the color used does approximate it.

NOMENCLATURE

All names on this sheet are approved by the International Astronomical Union (IAU, 1974, 1980). Double and triple letter designations for craters refer to position on the map and are derived from a grid based on equidistant meridians and parallels, the alphabet (A and O omitted) in the direction of increasing longitude (W) and latitude (N). The complete designation of a crater is the name of the quadrangle followed by double or triple letters. The prefix TH (identifying the Thaumasia quadrangle) is part of the complete designation but, for brevity, is not shown on most craters. Some craters have commemorative names; letter designations for these craters are shown in parentheses. Where craters lie mostly on an adjoining map, their letters are derived from the other map; where craters lie exactly on the boundary of two maps, their letters are derived from the eastern or southern map.

Abbreviation for Mars Chart 25, M 5M -48/90 RMC; Abbreviation for Mars 1:5,000,000 series, center of sheet, lat -48°, long 90° shaded relief map, R, with albedo markings, M, and contours, C.

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NOTE TO USERS

Users noting errors or omissions are urged to indicate them on the map and to forward it to Astrogeologic Studies, Geologic Division, 2205 North Gemini Drive, Flagstaff, Arizona 86001. A replacement copy will be returned.



INDEX TO MARINER 9 PICTURES USED TO MAKE THE ALBEDO MARKINGS OVERLAY

Most of the pictures indexed above were specially processed to accentuate albedo markings. Only the useful image area of the pictures are outlined.

Table with 4 columns: Index No., DAS No., Index No., DAS No. listing various Mariner 9 camera pictures used for albedo markings.

INDEX TO MARINER 9 PICTURES

The mosaic used to control the positioning of features on this map was made with the Mariner 9 A-camera pictures outlined above, identified by vertical numbers. Useful coverage is not available in the cross-hatched areas. Also shown (by solid black rectangles) are the high-resolution B-camera pictures, identified by italic numbers. The DAS numbers may differ slightly (usually by 3) among various versions of the same pictures.

Table with 4 columns: Index No., DAS No., Index No., DAS No. listing high-resolution B-camera pictures used for feature positioning.

QUADRANGLE LOCATION

Number preceded by I refers to published topographic map.

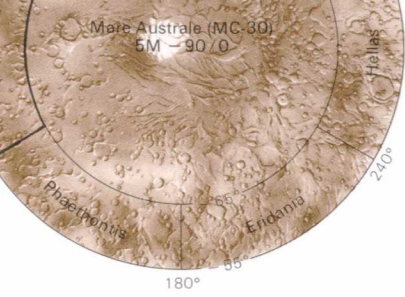


Table with 4 columns: Index No., Picture No., Index No., Picture No. listing Viking 1 and Viking 2 source images.

SUPPLEMENTAL SOURCE INDEX

Viking pictures were used where available to clarify Mariner 9 data. The outline for each sequence of pictures is shown.

Table with 4 columns: Index No., Picture No., Index No., Picture No. listing supplemental Viking source images.

TOPOGRAPHIC MAP OF THE THAUMASIA QUADRANGLE OF MARS

MC-25
M 5M -48/90 RMC
1979



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