

**NOTES ON BASE**  
This map sheet is one of a series covering the entire surface of Mars at nominal scales of 1:25,000,000 and 1:5,000,000 (Harrison, 1973, 1976). The major source of map data was the Mariner 9 television experiment (Marskrsky and others, 1976).

**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 3393.2 km and a polar radius of 3375.7 km. The true north-south height datum which is defined below under the heading "Contours".

**PROJECTION**  
The Mercator projection is used for this sheet, with a scale of 1:5,000,000 at the equator and 1:4,330,000 at lat 30°. Longitude increases to the west in accordance with the usage of the International Astronomical Union (IAU, 1971). Latitudes are geographic (Geocentric 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 Airy-0 (lat 5.19° S) within the crater Airy. No simple statement is possible for the projection, but local consistency is 10-15 km, except along the southern edge where inconsistencies as large as 20 km exist.

**MAPPING TECHNIQUES**  
A series of mosaics of Mercator projections of Mariner 9 pictures was assembled at 1:5,000,000.  
Shaded relief was copied from the mosaics and portrayed with uniform illumination with the sun to the west. Many Mariner 9 pictures besides those in the base mosaic were examined to improve the portrayal (Levinthal and others, 1973; Green and others, 1973; Inge and Bridges, 1976). The shading is generalized and may be interpreted with nearby photographic reliability (Inge, 1972).  
Shaded relief analysis and representation were made by Patricia M. Bridges.

**CONTOURS**  
Because Mars has no seas and hence no sea level, the datum (0 km contour line) for altitude is defined by a gravity field datum which is defined by spherical harmonics of fourth order and fourth degree (Dundas and Lorch, 1973) combined with a 6-millibar atmospheric pressure surface derived from radio-occultation data (Kliore and others, 1973; Christensen, 1975; Wu, 1975, 1976).

The contour lines on most of the Mars maps (Wu, 1975, 1976) were derived from earth-based radar altimetry measurements (Dundas and Lorch, 1973; Pettengill and others, 1971) and measurements made by Mariner 9 altimetry measurements (Dundas and Lorch, 1973; Pettengill and others, 1974), infrared interferometer spectrometer (Conrad and others, 1973), and stereoscopic Mariner 9 television pictures (Wu and others, 1973).

Formal analysis of the accuracy of topographic elevation information has not been made. The estimated vertical accuracy of each source of data indicates a probable error of 1.0 km.

**NOMENCLATURE**  
All names on this sheet are approved by the International Astronomical Union (IAU, 1974, 1977, 1980).

MC-19: Abbreviation for Mars Chart 19.  
M SM -15-22 G: Abbreviation for Mars 1:5,000,000 series, center of sheet, lat -15°, long 22° geocentric map projection.

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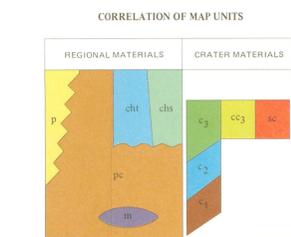
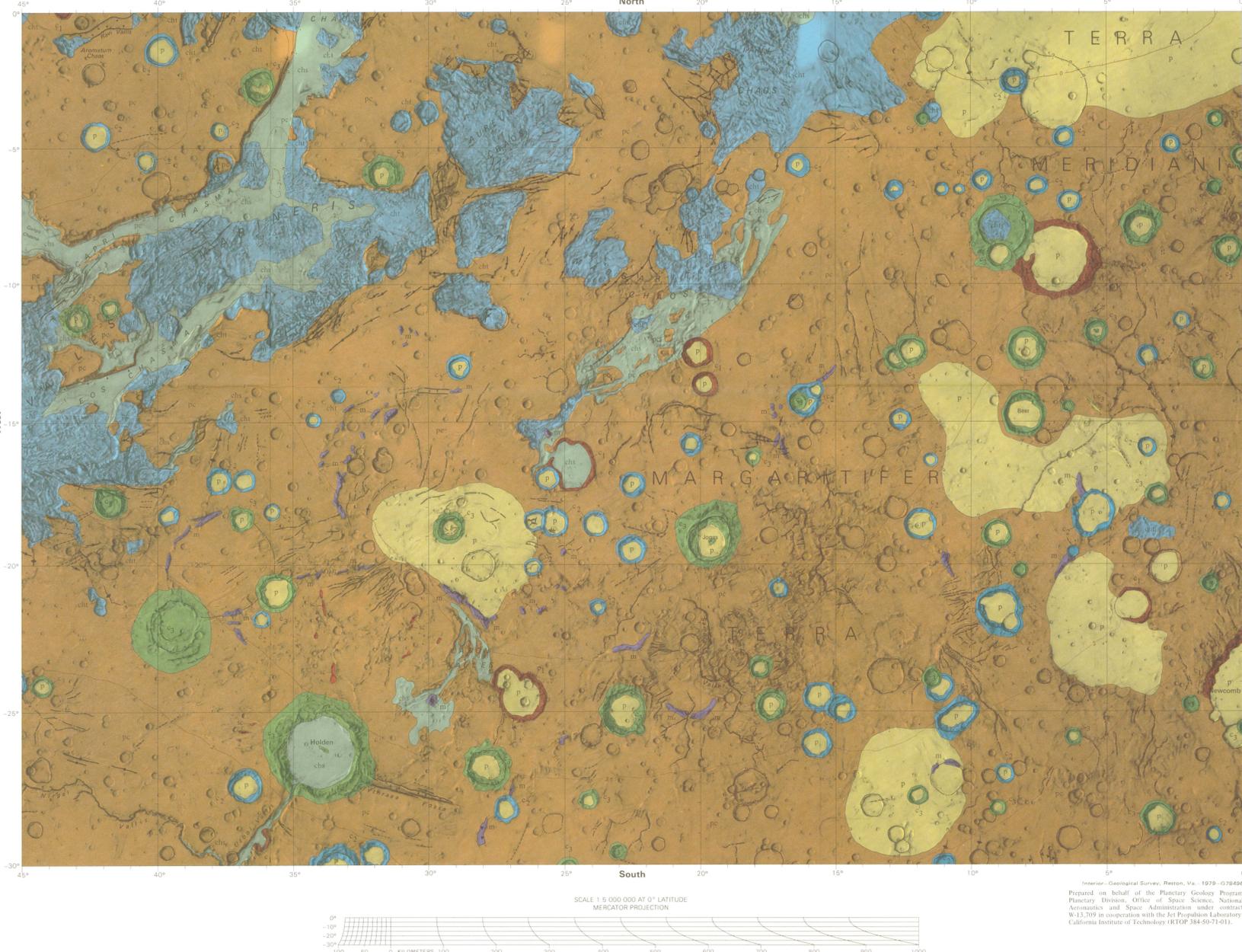
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**DESCRIPTION OF MAP UNITS**  
**REGIONAL MATERIALS**  
**p** SMOOTH-PLAINS MATERIAL—Forms smooth and gently undulating surface occupying crater floors and large expanses in northeastern and southeastern parts of quadrangle; some areas have isolated, low, irregular hills. Few channels occur in unit. Density of rock craters is same or slightly less than in cratered-plateau material (unit pc) but with fewer modified craters. Interpretation: Larger expanses outside of craters may be volcanic material. Material within craters is locally derived from crater walls. Surface material in all occurrences is fragmentary material deposited by wind.  
**cha** CHANNEL DEPOSITS—Form smooth surfaces in valley floors and contiguous areas. Interpretation: Material transported by moving water. Surface modified by wind, producing erosional landforms in places.  
**chl** CHAOTIC MATERIAL—Forms flat-topped to rounded blocks with scarpment depressions. In places structurally gradational with cratered-plateau material (unit pc), but defined as chaotic material where faulting and slumping have created individual blocks of adjoining units. Interpretation: Material of cratered plains chaotically disrupted and reassembled by downslope movement. Movement initiated in part by channel formation and by removal of support by flow of subsurface material, probably ice.  
**pc** CRATERED-PLATEAU MATERIAL—Forms smooth and gently undulating surfaces, occupied by craters of all morphologies. Contains numerous smooth channels. Locally has scarps and ridges. Interpretation: Complex unit of diverse origins; major part consists of crustal material approximately 1 km thick, chattered and brecciated by early saturation impact-crater bombardment extending back to earliest recognizable events on Mars. Locally, more recently formed surficial deposits not saturated with impact craters include volcanic materials, flows and ash, collan deposits, and water-laid sediment.  
**m** MOUNT MATERIAL—Forms smooth, rounded, and generally isolated elongated hills 10-100 m in greatest dimension, some in acute clusters. Interpretation: Remnants of eroded craters.

**CRATER MATERIALS**  
Craters are classified on basis of morphologic characteristics. Generally, most degraded craters are older. Craters smaller than 20 km in diameter are not mapped. Interpretation: Craters mapped in following classifications are of impact origin.  
**c3** MATERIAL OF SUBDEDGED CRATERS—Rims sharp and complete but narrow; distinctly elevated above surrounding terrain.  
**cc3** MATERIAL OF SUBDEDGED CRATER CLUSTERS—Small crater clusters with same morphology as c3 craters.  
**c2** MATERIAL OF DEGRADED CRATERS—Shallow, pun-shaped craters; rim not distinctly elevated above level of surrounding terrain.  
**c1** MATERIAL OF HIGHLY DEGRADED CRATERS—Rims incomplete and floor at or near elevation of surrounding terrain.  
**c0** SATELLITIC CRATER MATERIAL—Forms crater chains and depression subradial to crater Holden. Interpretation: Secondary impact craters.

**CRATER CHAIN**—Two or more craters arranged in a line.  
**CRATER DEPRESSION**—Depression within crater rim.  
**CRATER RING**—Ring of craters with concentric multiple rims.  
**CRATER WITH CENTRAL MOUNT**—Crater with central mountain.  
**CRATER WITH CENTRAL DEPRESSION**—Crater with central depression.  
**CRATER WITH CENTRAL HILL**—Crater with central hill.  
**CRATER WITH CENTRAL RIDGE**—Crater with central ridge.  
**CRATER WITH CENTRAL SCARP**—Crater with central scarp.  
**CRATER WITH CENTRAL WALL**—Crater with central wall.  
**CRATER WITH CENTRAL FLOOR**—Crater with central floor.  
**CRATER WITH CENTRAL PLAIN**—Crater with central plain.  
**CRATER WITH CENTRAL BASIN**—Crater with central basin.  
**CRATER WITH CENTRAL LAKE**—Crater with central lake.  
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**ALBEDO MARKINGS AND CONTOURS**  
Contour interval 1 kilometer. Surface markings derived from selected Mariner 9 photographs.

| DAS No. |
|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 1       | 111201  | 22      | 642001  | 43      | 915001  | 64      | 907001  | 22      | 763001  |
| 2       | 111202  | 23      | 642002  | 44      | 915002  | 65      | 907002  | 23      | 763002  |
| 3       | 111203  | 24      | 642003  | 45      | 915003  | 66      | 907003  | 24      | 763003  |
| 4       | 111204  | 25      | 642004  | 46      | 915004  | 67      | 907004  | 25      | 763004  |
| 5       | 111205  | 26      | 642005  | 47      | 915005  | 68      | 907005  | 26      | 763005  |
| 6       | 111206  | 27      | 642006  | 48      | 915006  | 69      | 907006  | 27      | 763006  |
| 7       | 111207  | 28      | 642007  | 49      | 915007  | 70      | 907007  | 28      | 763007  |
| 8       | 111208  | 29      | 642008  | 50      | 915008  | 71      | 907008  | 29      | 763008  |
| 9       | 111209  | 30      | 642009  | 51      | 915009  | 72      | 907009  | 30      | 763009  |
| 10      | 111210  | 31      | 642010  | 52      | 915010  | 73      | 907010  | 31      | 763010  |
| 11      | 111211  | 32      | 642011  | 53      | 915011  | 74      | 907011  | 32      | 763011  |
| 12      | 111212  | 33      | 642012  | 54      | 915012  | 75      | 907012  | 33      | 763012  |
| 13      | 111213  | 34      | 642013  | 55      | 915013  | 76      | 907013  | 34      | 763013  |
| 14      | 111214  | 35      | 642014  | 56      | 915014  | 77      | 907014  | 35      | 763014  |
| 15      | 111215  | 36      | 642015  | 57      | 915015  | 78      | 907015  | 36      | 763015  |
| 16      | 111216  | 37      | 642016  | 58      | 915016  | 79      | 907016  | 37      | 763016  |
| 17      | 111217  | 38      | 642017  | 59      | 915017  | 80      | 907017  | 38      | 763017  |
| 18      | 111218  | 39      | 642018  | 60      | 915018  | 81      | 907018  | 39      | 763018  |
| 19      | 111219  | 40      | 642019  | 61      | 915019  | 82      | 907019  | 40      | 763019  |
| 20      | 111220  | 41      | 642020  | 62      | 915020  | 83      | 907020  | 41      | 763020  |
| 21      | 111221  | 42      | 642021  | 63      | 915021  | 84      | 907021  | 42      | 763021  |
| 22      | 111222  | 43      | 642022  | 64      | 915022  | 85      | 907022  | 43      | 763022  |
| 23      | 111223  | 44      | 642023  | 65      | 915023  | 86      | 907023  | 44      | 763023  |
| 24      | 111224  | 45      | 642024  | 66      | 915024  | 87      | 907024  | 45      | 763024  |
| 25      | 111225  | 46      | 642025  | 67      | 915025  | 88      | 907025  | 46      | 763025  |
| 26      | 111226  | 47      | 642026  | 68      | 915026  | 89      | 907026  | 47      | 763026  |
| 27      | 111227  | 48      | 642027  | 69      | 915027  | 90      | 907027  | 48      | 763027  |
| 28      | 111228  | 49      | 642028  | 70      | 915028  | 91      | 907028  | 49      | 763028  |
| 29      | 111229  | 50      | 642029  | 71      | 915029  | 92      | 907029  | 50      | 763029  |
| 30      | 111230  | 51      | 642030  | 72      | 915030  | 93      | 907030  | 51      | 763030  |
| 31      | 111231  | 52      | 642031  | 73      | 915031  | 94      | 907031  | 52      | 763031  |
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| 33      | 111233  | 54      | 642033  | 75      | 915033  | 96      | 907033  | 54      | 763033  |
| 34      | 111234  | 55      | 642034  | 76      | 915034  | 97      | 907034  | 55      | 763034  |
| 35      | 111235  | 56      | 642035  | 77      | 915035  | 98      | 907035  | 56      | 763035  |
| 36      | 111236  | 57      | 642036  | 78      | 915036  | 99      | 907036  | 57      | 763036  |
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| 40      | 111240  | 61      | 642040  | 82      | 915040  | 103     | 907040  | 61      | 763040  |
| 41      | 111241  | 62      | 642041  | 83      | 915041  | 104     | 907041  | 62      | 763041  |
| 42      | 111242  | 63      |         |         |         |         |         |         |         |