

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

Prepared for the  
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

**NOTES ON BASE**  
This map is one in a series covering the entire surface of Mars at a nominal scale of 1:5,000,000. The series was originally compiled from Mariner 9 data (Batson and others, 1979). The original shaded relief base was revised and augmented with image data from Viking Orbiter, but feature positions were not shifted to fit controls derived from Viking.

**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 3,393.4 km and a polar radius of 3,375.7 km.

**PROJECTION**  
The Mercator, Lambert Conformal Conic, and Polar Stereographic projections are used for this map series. The scale of the series is 1:5,000,000 at the equator. The projections have common scales of 1:4,836,000 at lat ±30° and 1:4,306,000 at lat ±65°. Standard parallels for the Lambert Conformal Conic projection are at lat ±35.8° and ±59.2°. Longitude increases to the west in accordance with astronomical convention for Mars. Latitude is planetographic.

**CONTROL**  
Planimetric control of the shaded relief is provided by photogrammetric triangulation using Mariner 9 images (Davies, 1973; Davies and Arthur, 1973) and the radio-tracked position of the Mariner 9 spacecraft. The first meridian passes through the center of a small crater, Atiy-O (lat 5.19° S, long 0°), within the crater Atiy.

Primary controls used in the network include the Viking Orbiter Secondary Experiment Data Record, radio-occlusion measurements from both Mariner 9 and Viking Missions (Lund and others, 1972; Kibire and others, 1973; Lindal and others, 1979), Earth-based radar observations (Petengill and others, 1971; Downs and others, 1975), and the Mars primary control network of the Rand Corporation (Davies and others, 1978).

**MAPPING TECHNIQUE**  
Shaded relief was portrayed by photointerpretive methods described by Inge and Bridges (1976). Uniform sun illumination from the west was used throughout. The original rendition of feature positions, sizes, and shapes was taken from a controlled base mosaic of Mariner 9 images. Various computer enhancements of many Mariner 9 and Viking Orbiter images besides those in the base mosaic were examined in an attempt to portray the surface as accurately as possible.

Initial shaded relief analysis and representation were made by Susan L. Davis; revisions were made by Patricia M. Bridges.

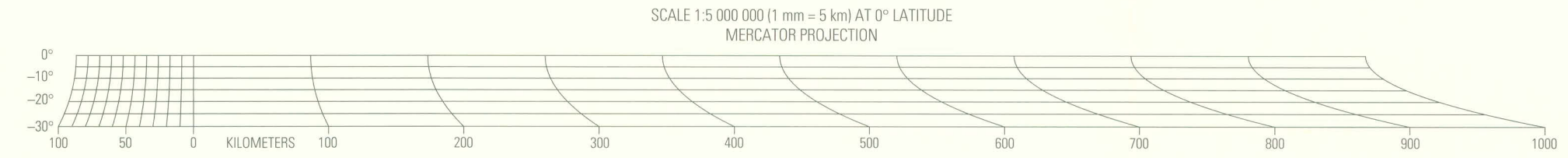
**COLOR**  
No attempt was made on the map to duplicate precisely the color of the martian surface, although the color used may approximate it.

**NOMENCLATURE**  
Names on this sheet are approved by the International Astronomical Union (IAU, 1974, 1977, 1980, 1983, 1986, 1989, 1996, 1998).

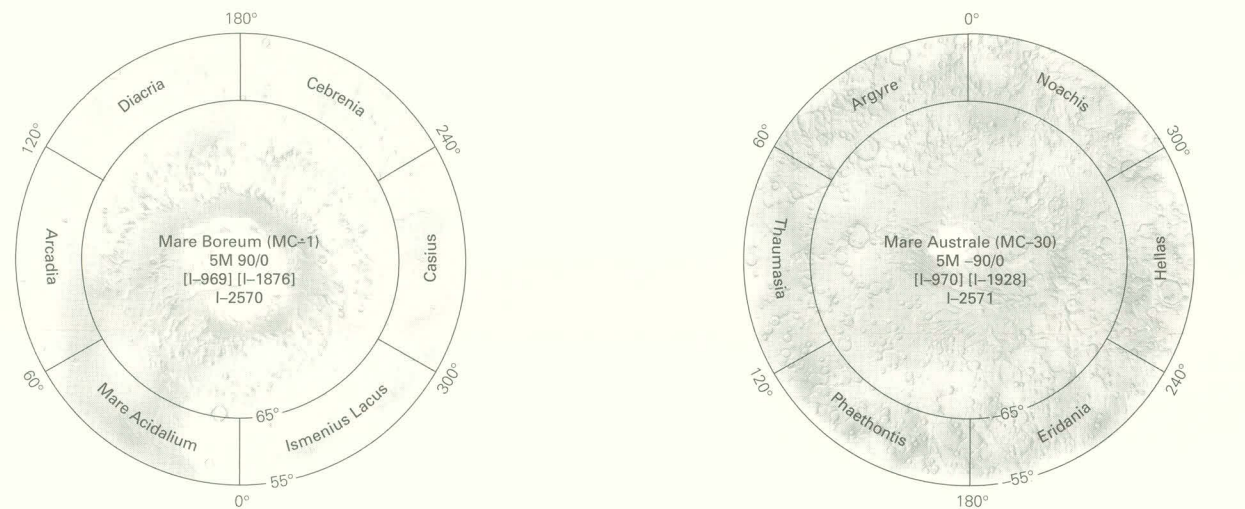
MC-18: Abbreviation for Mars Chart 18.  
M 5M-15/68 RN: Abbreviation for Mars, 1:5,000,000 series, center of sheet, lat 15° S., long 68° S., shaded relief map (R) with nomenclature (N).

**REFERENCES**

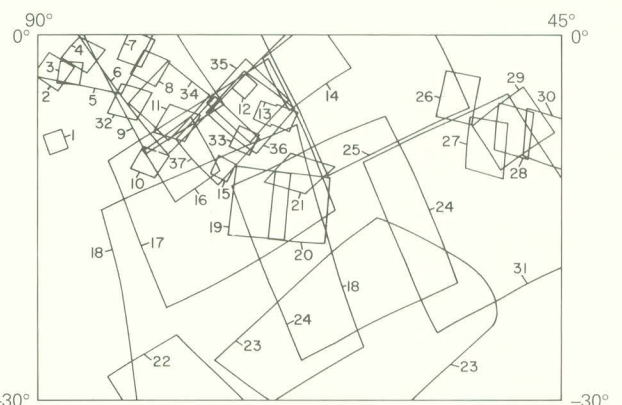
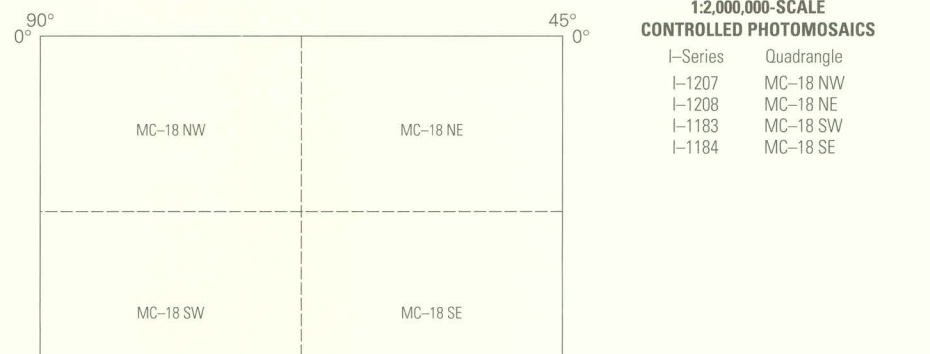
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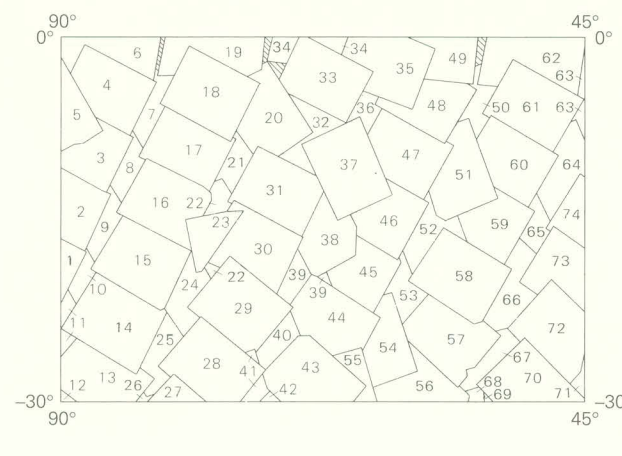
Shaded relief revised in January 1987 on behalf of the Planetary Geology Program, Solar System Exploration Division, Office of Space Science, National Aeronautics and Space Administration.  
This map supersedes map I-1253.  
Edited by Doris Weir and Derrick D. Hirsch; cartography by Darlene A. Cassibier.  
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Diacia (MC-2)		Anaxia (MC-3)		Mare Acidulum (MC-4)		Ismenius Lacus (MC-5)		Caesus (MC-6)		Cerberus (MC-7)	
SM 48150	SM 48930	SM 48930	SM 48930	SM 48230	SM 48230	SM 48230	SM 48230	SM 48230	SM 48230	SM 48230	SM 48230
I-1889 [I-1292]	I-1863 [I-1477]	I-1863 [I-1477]	I-1863 [I-1477]	I-1863 [I-1477]	I-1863 [I-1477]	I-1863 [I-1477]	I-1863 [I-1477]	I-1863 [I-1477]	I-1863 [I-1477]	I-1863 [I-1477]	I-1863 [I-1477]
I-2572	I-2578	I-2578	I-2578	I-2578	I-2578	I-2578	I-2578	I-2578	I-2578	I-2578	I-2578



VIKING 1		VIKING 2	
Index No.	Picture No.	Index No.	Picture No.
1	65A02	17	58A01
2	58A04	18	63A43
3	63A70	19	238A5
4	57A48	20	338A7
5	12A23	21	58A91
6	12A13	22	63A96
7	58A28	23	40A74
8	58A27	24	65A81
9	62A30	25	65A82
10	63A37	26	89A72
11	58A77	27	89A73
12	63A30	28	89A70
13	91A12	29	61A13
14	91A13	30	89A28
15	91A04	32	58A71
16	60A70	33	91A08



A-camera pictures	
Index No.	DAS No.
1	7326583
2	7326553
3	7326723
4	7326753
5	8723998
6	7327142
7	8801589
8	8801489
9	8801419
10	8801349
11	5923438
12	5925253
13	5925323
14	7328473
15	7328543
16	7328613
17	7328683
18	7328753
19	7328823

**INDEX OF VIKING SOURCES**  
This shaded relief map has been revised by utilizing 1:2,000,000-scale controlled photomosaics and supplementary Viking pictures outlined above. Copies of various enhancements of these pictures are available from National Space Science Data Center, Code 601, Goddard Space Flight Center, Greenbelt, MD 20771.

**INDEX OF 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. Useful coverage is not available in the cross-hatched areas. The DAS number may vary slightly (usually by 5) among different versions of the same picture.

**NOTE TO USERS**  
Users noting errors or omissions are urged to indicate them on the map and to forward it to U.S. Geological Survey, Building 4, Room 450, 2255 North Gemini Drive, Flagstaff, Arizona 86001. A replacement copy will be returned.

REVISED SHADED RELIEF MAP OF THE COPRATES QUADRANGLE (MC-18) OF MARS



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