



**NOTES ON BASE**

This map is one in a series covering the entire surface of Mars at a normal scale of 1:5,000,000. The series was originally compiled from Mariner 9 data (Bateson 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 1:4,336,000 at lat 33° and 1:4,306,000 at lat 60°. Standard parallels for the Lambert Conformal Conic projection are at lat 33.5° and 45.9°. 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, Airy-O (lat 5.19° S, long 0°), within the crater Airy.

Primary controls used in the network include the Viking Orbiter Secondary Experiment Data Record, radio-occultation measurements from both Mariner 9 and Viking Missions (Lorell and others, 1972; Kliore and others, 1973; Lindal and others, 1979). Earth-based radar observations (Pettengill 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 photostereographic 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 based on Viking Orbiter data were made by Anthony G. Sanchez; revisions were made by Barbara J. Hall.

**COLOR**

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

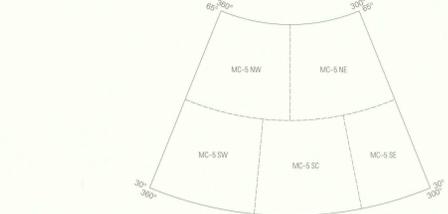
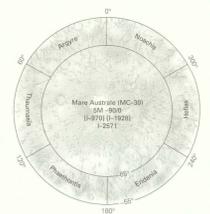
**NOMENCLATURE**

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

MC-5: Abbreviation for Mars Chart 5.  
M 5M 48/330 RN: Abbreviation for Mars, 1:5,000,000 series; center of sheet, lat 48° N, long 330°; shaded relief map (R) with nomenclature (N).

**REFERENCES**

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Pettengill, G.H., Rogers, A.E.E., and Shapiro, I.I., 1971, Martian craters and a scarps as seen by radar. Science, v. 174, no. 4016, p. 1321-1324.



**1:2,000,000 SCALE CONTROLLED PHOTOMOSAICS**

Index No.	Picture No.						
1	489A26	22	723A65	43	759A02	64	783A28
2	489A27	23	723A66	44	759A03	65	783A29
3	489A28	24	723A67	45	759A04	66	783A30
4	489A29	25	723A68	46	759A05	67	783A31
5	489A30	26	723A69	47	759A06	68	783A32
6	489A31	27	723A70	48	759A07	69	783A33
7	489A32	28	723A71	49	759A08	70	783A34
8	489A33	29	723A72	50	759A09	71	783A35
9	489A34	30	723A73	51	759A10	72	783A36
10	489A35	31	723A74	52	759A11	73	783A37
11	489A36	32	723A75	53	759A12	74	783A38
12	489A37	33	723A76	54	759A13	75	783A39
13	489A38	34	723A77	55	759A14	76	783A40
14	489A39	35	723A78	56	759A15	77	783A41
15	489A40	36	723A79	57	759A16	78	783A42
16	489A41	37	723A80	58	759A17	79	783A43
17	489A42	38	723A81	59	759A18	80	783A44
18	489A43	39	723A82	60	759A19	81	783A45
19	489A44	40	723A83	61	759A20	82	783A46
20	489A45	41	723A84	62	759A21	83	783A47
21	489A46	42	723A85	63	759A22	84	783A48



**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 801, Goddard Space Flight Center, Greenbelt, MD 20771.

**INDEX I**

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1	489A26	22	723A65	43	759A02	64	783A28
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3	489A28	24	723A67	45	759A04	66	783A30
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6	489A31	27	723A70	48	759A07	69	783A33
7	489A32	28	723A71	49	759A08	70	783A34
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11	489A36	32	723A75	53	759A12	74	783A38
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15	489A40	36	723A79	57	759A16	78	783A42
16	489A41	37	723A80	58	759A17	79	783A43
17	489A42	38	723A81	59	759A18	80	783A44
18	489A43	39	723A82	60	759A19	81	783A45
19	489A44	40	723A83	61	759A20	82	783A46
20	489A45	41	723A84	62	759A21	83	783A47
21	489A46	42	723A85	63	759A22	84	783A48



**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 crosshatched areas. The DAS number may vary slightly (usually by 5) among different versions of the same picture.

**QUADRANGLE LOCATION**  
Number preceded by I refers to published shaded relief map.  
(Number in brackets refers to earlier map superseded by revised version.)

**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 464, 2226 North Gemini Drive, Flagstaff, Arizona 86001. A replacement copy will be returned.

**REVISED SHADED RELIEF MAP OF THE ISMENIUS LACUS QUADRANGLE (MC-5) OF MARS**

1999

For sale by U.S. Geological Survey Information Services, Box 2986, Federal Center, Denver, CO 80225

