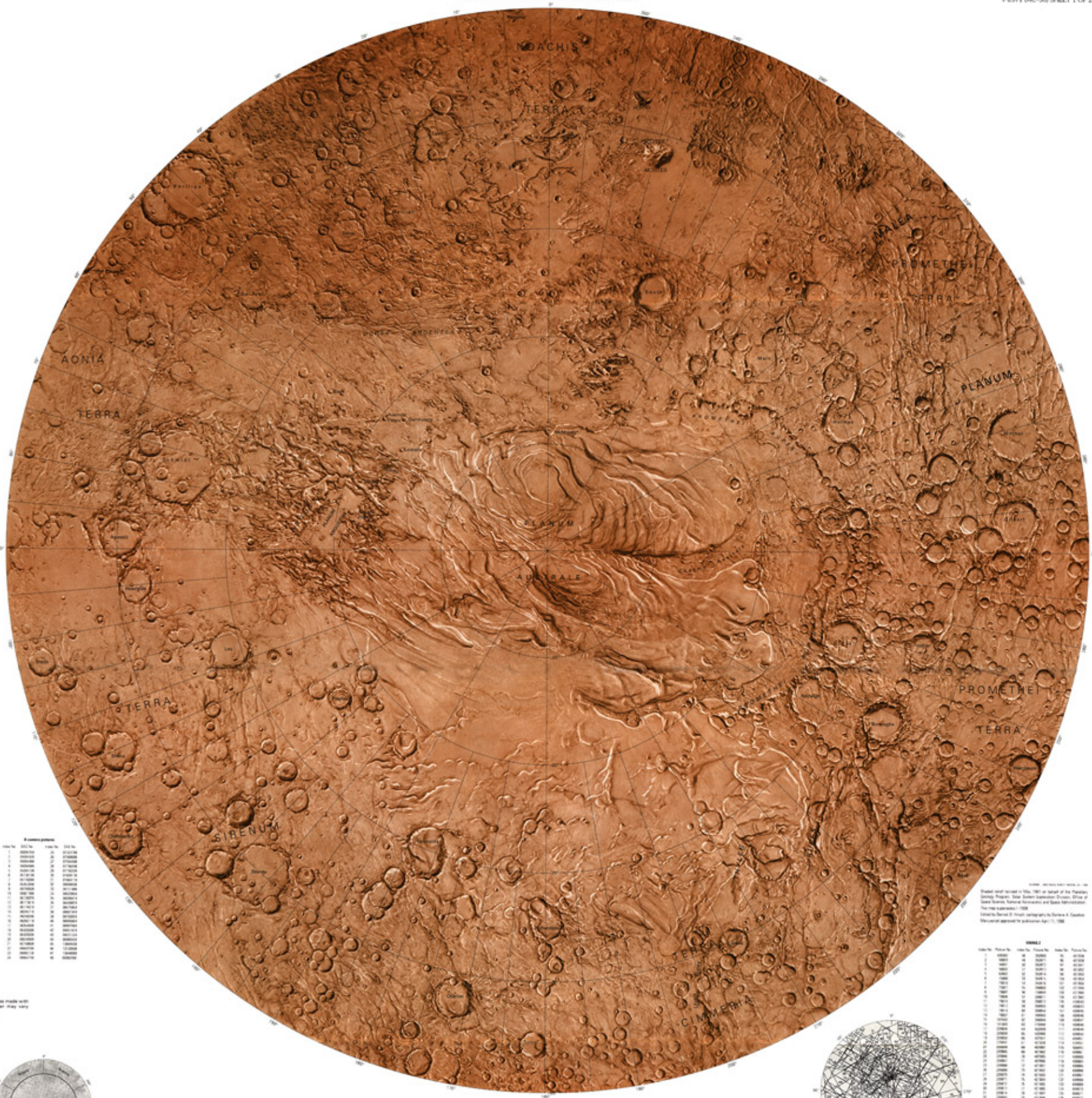
U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

Prepared for the
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

ATLAS OF MARS
1:5,000,000 TOPOGRAPHIC SERIES
MARE AUSTRALE REGION
M SM–90/0 RN, 1999
I-2571 (MC–30) SHEET 1 OF 2



NOTES ON BASE

The 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 controlled 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 conformal scales of 1:4,336,000 at lat +30° and 1:4,306,000 at lat 30S°. Standard parallels for the Lambert Conformal Conic projection are at lat +35.8° and 65.8°. Longitude increases to the east 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-0 (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 Mariners (Lorell and others, 1972; Kliore and others, 1973; Lindal and others, 1979), Earth-based radar observations (Pettengill and others, 1971; Downs and others, 1973), 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 east was used throughout. The original positions 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 Patricia M. Bridges; 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, 1958, 1967, 1970, 1973, 1976, 1979, 1982, 1985, 1988, 1991, 1994, 1997, 2000, 2003) except for provisional names, which are marked by an asterisk.

MC–30 Abbreviation for Mars Chart 30.

M SM –90/0 RN Abbreviation for Mars 1:5,000,000 series, sphere of shape, lat 90° S., long 0°, shaded relief map (R) with nomenclature (N).

REFERENCES

Batson, R.M., Bridges, P.M., and Inge, J.L., 1979, Atlas of Mars—The 1:5,000,000 map series: National Aeronautics and Space Administration Special Publication 438, 146 p.

Davies, M.E., 1973, Mariner 9—Primary control net: Photogrammetric Engineering, v. 39, no. 12, p. 1295–1302.

Davies, M.E., and Arthur, D.W.G., 1973, Martian surface coordinates: Journal of Geophysical Research, v. 78, no. 20, p. 4355–4394.

Davies, M.E., Katayama, T.Y., and Roth, J.A., 1978, Control net of Mars: February 1987: The Rand Corporation, R-2309-NASA, 91 p.

Downs, G.S., Reichley, P.E., and Green, R.R., 1973, Radar measurements of martian topography and surface properties: Icarus, v. 18, no. 3, p. 273–312.

Inge, J.L., and Bridges, P.M., 1976, Applied photointerpretation for airbrush cartography: Photogrammetric Engineering and Remote Sensing, v. 42, no. 6, p. 749–760.

International Astronomical Union, 1958, Commission 16: Physical study of planets and satellites and of Comet and meteor nomenclature, in Proceedings of the 11th General Assembly, Sydney, 1973: Transactions of the International Astronomical Union, v. 15B, p. 185–188, 207–221.

1973, Working Group for Planetary System Nomenclature, in Proceedings of the 16th General Assembly, Grenoble, 1976: Transactions of the International Astronomical Union, v. 16B, p. 321–326, 331–336, 355–362.

1976a, Working Group for Planetary System Nomenclature, in Proceedings of the 17th General Assembly, New Delhi, 1979: Transactions of the International Astronomical Union, v. 17B, p. 109–153.

1976, Working Group for Planetary System Nomenclature, in Proceedings of the 20th General Assembly, Baltimore, 1988: Transactions of the International Astronomical Union, v. 20B, p. 369–372.

1991, Working Group for Planetary System Nomenclature, in Proceedings of the 21st General Assembly, Buenos Aires, 1991: Transactions of the International Astronomical Union, v. 21B, p. 353–363.

1994, Working Group for Planetary System Nomenclature, in Proceedings of the 22th General Assembly, The Hague, 1994: Transactions of the International Astronomical Union, v. 22B, p. 205–211.

Kliore, A.J., Fjeldbo, Giovnar, Seidel, B.L., Sykes, M.J., and Woiceshyn, P.M., 1973, S-band radio occultation measurements of the atmosphere and topography of Mars with Mariner 9: Extended mission coverage of polar and cross-meridian latitudes: Journal of Geophysical Research, v. 78, no. 20, p. 4331–4351.

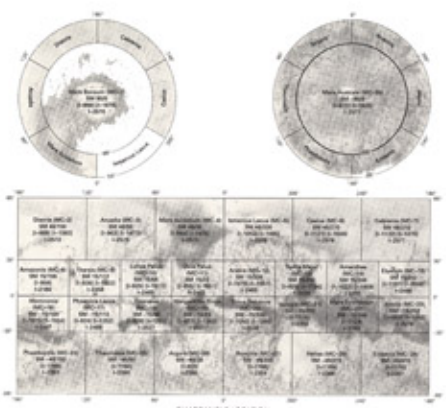
Lindal, G.F., Hotz, H.B., Sweetnam, D.N., Shippony, Zvi, Brenkle, J.P., Hartsell, G.V., and Spear, R.T., 1979, Viking radio occultation measurements of the atmosphere and topography of Mars: Journal of Geophysical Research, v. 84, no. B14, p. 8443–8456.

Lorell, Jack, Born, G.H., Jordan, J.F., Lang, P.A., Martin, W.L., Seagren, W.J., Shapiro, I.I., Rosenberg, R.D., and Slater, G.L., 1972, Mariner 9 celestial mechanics experiment: Gravity field and pole direction of Mars: Science, v. 175, no. 4019, p. 317–320.

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

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

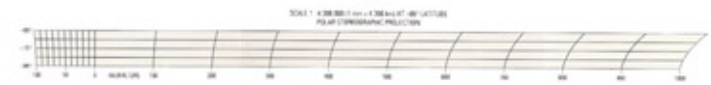


QUADRANGLE LOCATION

Number preceded by ( ) 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 104, 2255 North Gemini Drive, Flagstaff, Arizona 86001. A replacement copy will be returned.



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.

REVISED SHADED RELIEF MAP OF THE MARE AUSTRALE REGION (MC–30) OF MARS

1999