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

Prepared for the
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

ATLAS OF VENUS
1:50,000,000 SERIES
V 50M 0/0 CMRN, 1997
I–2444 SHEET 2 OF 4

NORTH POLAR REGION

SCALE 1:30 573 561 (1 mm = 30.57 km) AT 90° LATITUDE
POLAR STEREOGRAPHIC PROJECTION

NOTES ON BASE

This sheet is one in a series of maps of Venus at nominal scales of 1:50,000,000 and 1:10,000,000 (Planetary Cartography Working Group, 1984, 1993; Batson and others, 1994). It is based on data from the Magellan Synthetic Aperture Radar (SAR) and radar altimetry instruments. The Magellan Mission was described by Saunders and Pettengill (1991). Magellan radar characteristics were described by Pettengill and others (1991).

ADOPTED FIGURE

The figure of Venus used for the computation of the map projection is a sphere with a mean radius of 6,051.0 km, consistent with the preliminary gravity figure reported by Phillips and others (1979) that was used for previous maps of Venus. Slightly larger values of the mean radius of Venus have subsequently been reported based on Pioneer Venus (Pettengill and others, 1980) and Magellan altimetry (Ford and Pettengill, 1992).

PROJECTION

The Mercator projection is used between the 57° parallels, and the polar stereographic projection is used for the polar regions north and south of the 55° parallels. The scale is 1:50,000,000 at lat 0° (Mercator) and 1:30,573,561 at ±90° (polar stereographic); both projections share a common scale of 1:27,959,645 at lat ±56°. Due to the retrograde rotation of Venus, longitude increases from west to east in accordance with usage of the International Astronomical Union (1971).

CONTROL

Planimetric control is derived from the radio-tracked position of the spacecraft. The first meridian passes through the central peak of the crater Ariadne, at lat 43.8° N., according to current International Astronomical Union convention. (Ariadne replaces the feature "Eve," which, at the same longitude, originally fixed the location of the prime meridian (Davies and others, 1986).) The Venusian cartographic coordinate system was described by Davies and others (1992).

MAPPING TECHNIQUES

This map image base is compiled from the synthetic aperture radar (SAR) image mosaic (sheet 1) overlayed upon the relief image used as a relief base in sheet 4. Magellan SAR datasets were originally produced by the Jet Propulsion Laboratory. Full-resolution (75 m/pixel) image strips were compressed and mosaicked to produce C1-MIDR's (Compressed-Once Mosaicked Image Data Records; 225 m/pixel) (Pettengill and others, 1991). C1-MIDR's were assembled and reprojected. Cycles 1 and 2 left (east)-looking and Cycle 2 right (west)-looking data records were used in the (SAR) image mosaic. (Cycle 1 radar operations commenced September 15, 1990, and ended May 1, 1991; Cycle 2 began May 16, 1991, and ended January 17, 1992; Cycle 3 began January 17, 1992, and ended September 13, 1992).

The underlying relief image was compiled by interpretation and digital manipulation of computer-generated relief images from the Magellan altimetry data. Topographic information obtained from Magellan radar altimeter measurements was rendered as a shaded relief image by converting the slope segments between elevation values to reflectance values, using methods described by Edwards (1987). All landforms were shown as if illuminated from the west. Data for shaded relief were derived from computer processing of radar altimetric information provided by the Massachusetts Institute of Technology (Pettengill and others, 1991). Interpretive image-processing was then used to remove artifacts and to enhance the digital-image details, by use of portrayal and photo-interpretive methods described by Inge and Bridges (1976). Synthetic aperture radar (SAR) imagery was used to confirm geographic features and control as well as to aid in adding distinctive surface features revealed by the sharper resolution of the SAR images. Gaps in coverage by the Magellan radar altimeter were filled by lower resolution image data from the Pioneer Venus Mission, precluding uniform portrayal of detail.

SAR mosaic processing was done by Robert M. Sucharski; creation of the shaded relief base and image compilation were done by Ralph Aeschliman.

NOMENCLATURE

Names on this sheet are approved by the International Astronomical Union (IAU, 1980, 1983, 1986, 1992, and 1996) except for provisional names, which are shown by an asterisk.

V 50M 0/0 CMRN: Abbreviation for Venus; 1:50,000,000 series; center of map, lat 0°, long 0°; controlled mosaic (CM) with shaded relief (R) and nomenclature (N).

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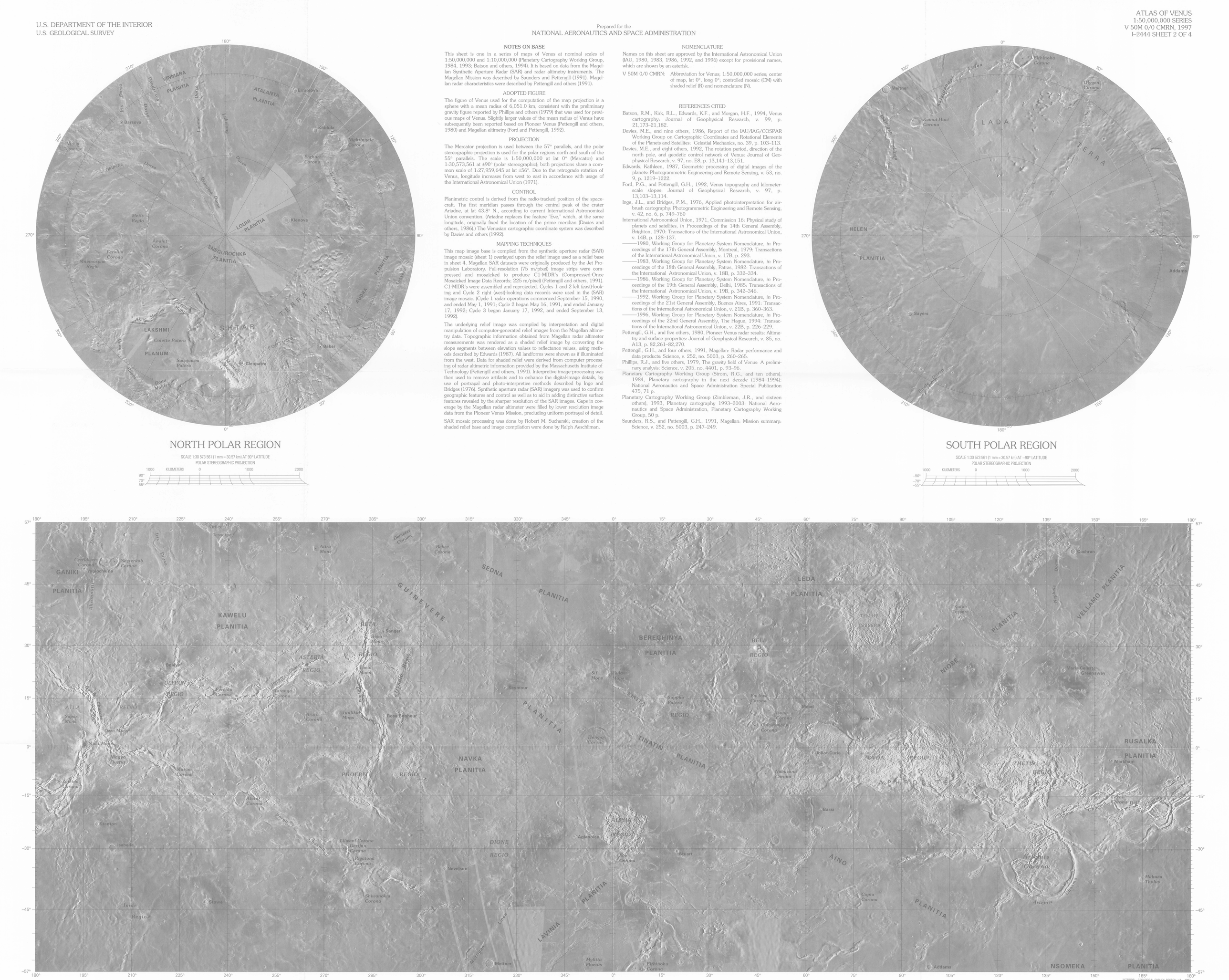
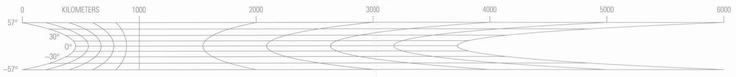
SOUTH POLAR REGION

SCALE 1:30 573 561 (1 mm = 30.57 km) AT –90° LATITUDE
POLAR STEREOGRAPHIC PROJECTION



RADAR IMAGE AND SHADED RELIEF MAP OF VENUS

SCALE 1:50 000 000 (1mm = 50 km) AT 0° LATITUDE
MERCATOR PROJECTION



V 50M 0/0 CMRN

1997

INTERIOR—GEOLOGICAL SURVEY, RESTON, VA—1997

Prepared on behalf of the NASA Planetary Geology and Geophysics program and the Magellan Project Office of the Jet Propulsion Laboratory

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Manuscript approved for publication August 18, 1993

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, AZ 86001. A replacement copy will be returned.

For sale by U.S. Geological Survey, Information Services, Box 25286, Federal Center, Denver, CO 80225