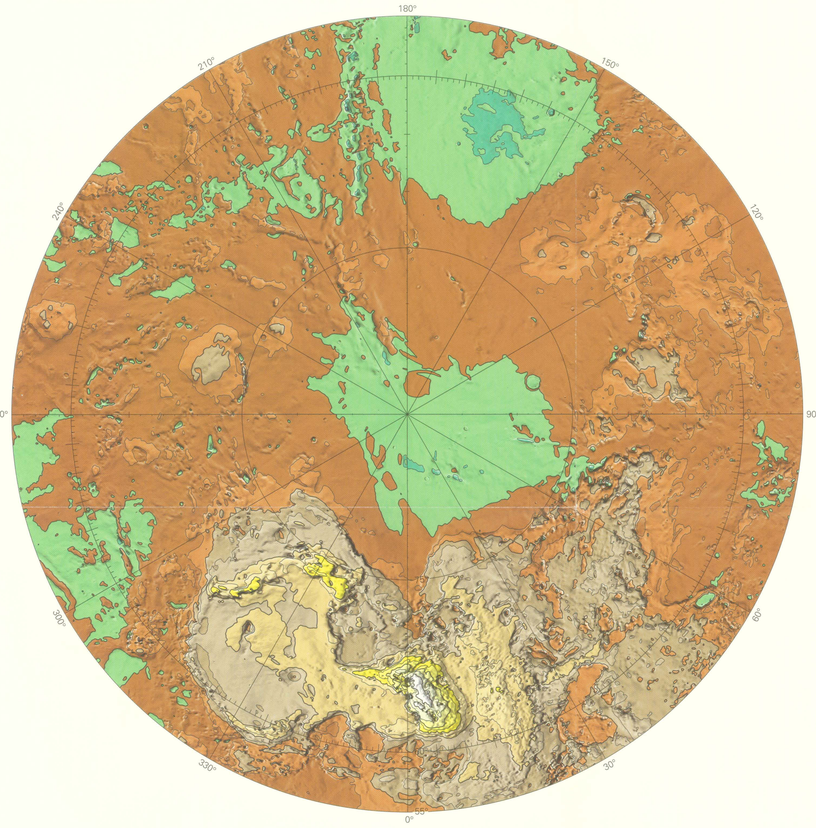
U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

Prepared for the
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

ATLAS OF VENUS
1:50,000,000 SERIES
V 50M 0/0 RTK, 1997
I–2444 SHEET 4 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, 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 of 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).

CONTOURS

Because Venus has no surface water and hence no sea level, the topographic datum (the 0-km contour) is defined as a sphere with a radius of 6,051.0 km. Data for topographic contours were derived from computer processing of Magellan radar altimetric data provided by the Massachusetts Institute of Technology (Pettengill and others, 1991). These contours were then vectorized and brought into accord with the relief image (see Mapping Techniques, below).

MAPPING TECHNIQUES

Topographic information obtained from Magellan radar altimeter measurements has been shown as shaded relief by converting the slope segments between elevation values to reflectance values, using methods described by Edwards (1987). All landforms are 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 used to remove artifacts, to enhance the digital-image details, and to add distinctive surface features taken from SAR images by use of portrayal and photointerpretive methods previously used in airbrush cartography described by Inge and Bridges (1976). Gaps in coverage by the Magellan radar altimeter were filled by lower resolution image data from the Pioneer Venus and Venera 15 and 16 missions, precluding uniform portrayal of detail. Contours were generated at one kilometer elevation intervals from the altimetry data and matched to the new relief image. From these modified contours the color slice was generated.

Colors were chosen to lead the viewer to intuitively accept elevation information, that is, the colors help the viewer automatically see one elevation as higher or lower than other elevations. Also, colors selected suggest a rocky landscape rather than water or vegetation. A deliberate color contrast between a malachite green and a sienna (brown) was chosen to demarcate the 0 km contour boundary (radius of 6,051.0 km). The color slice was then merged with the relief image.

Shaded relief image (interpretation and portrayal), elevation contours, and cartographic processing by Ralph Aeschliman.

NOMENCLATURE

V 50M 0/0 RTK: Abbreviation for Venus; 1:50,000,000 series; center of map, lat 0°, long 0°; shaded relief (R) with contours (T) and color slice (K).

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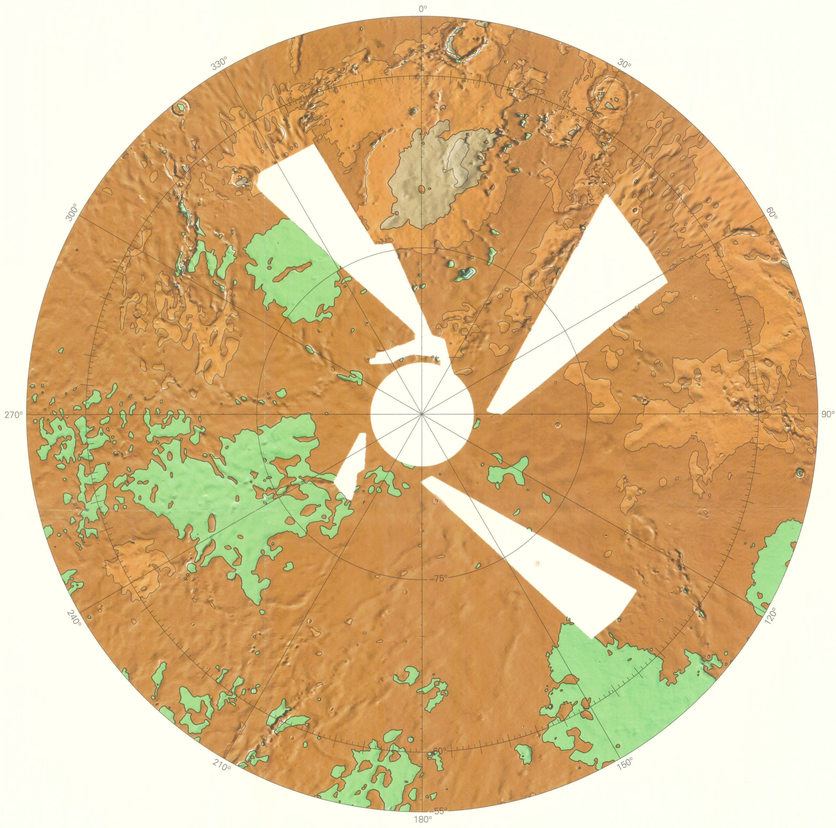
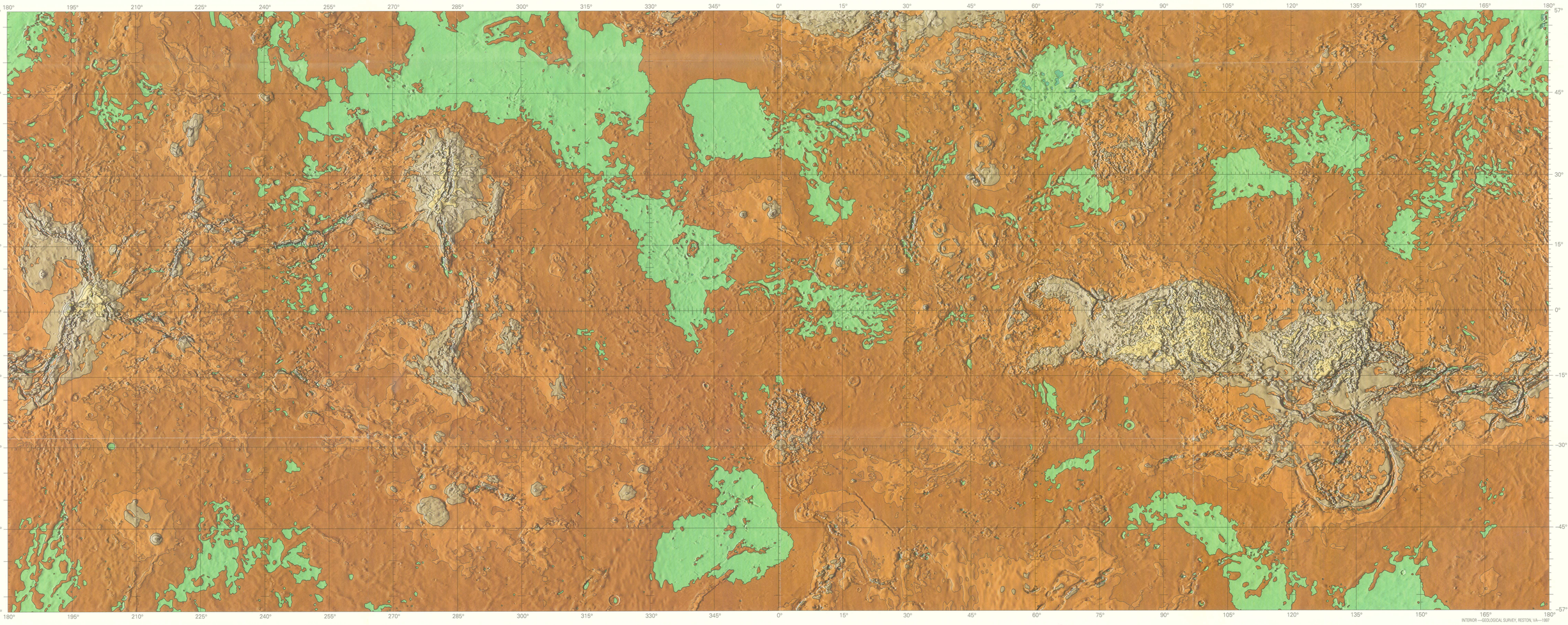
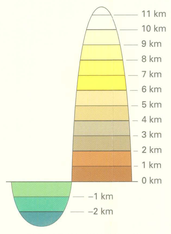


SOUTH POLAR REGION

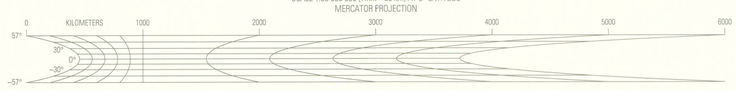
SCALE 1:30 573 561 (1 mm = 30.57 km) AT –90° LATITUDE
POLAR STEREOGRAPHIC PROJECTION





ELEVATION CONTOURS
"0 km" equals a planetary radius of 6051.0 km

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



TOPOGRAPHIC MAP OF VENUS

V 50M 0/0 RTK

1997

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 N. Gemini Drive, Flagstaff, AZ 86001. A replacement copy will be returned.

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