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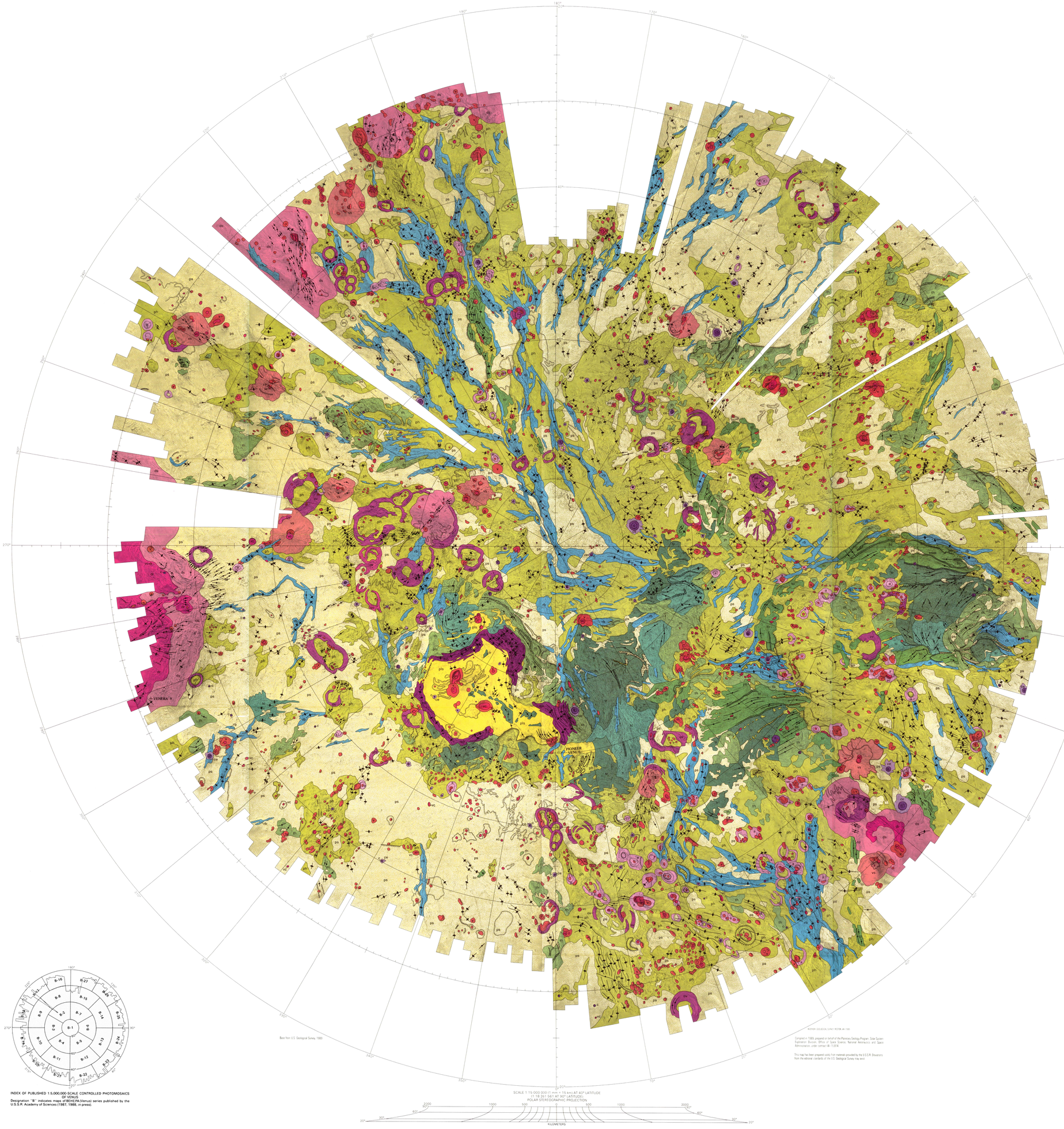
ATLAS OF VENUS
1:15,000,000 TOPOGRAPHIC SERIES
NORTHERN HEMISPHERE
V 15M 90/0 G, 1989
I-2059



INDEX OF PUBLISHED 1:5,000,000-SCALE CONTROLLED PHOTOMOSAICS OF VENUS

Designation "B" indicates maps of BENEIPA (Venus) series published by the U.S.S.R. Academy of Sciences (1987, 1988, in press).

GEOMORPHIC/GEOLOGIC MAP OF PART OF THE NORTHERN HEMISPHERE OF VENUS

By

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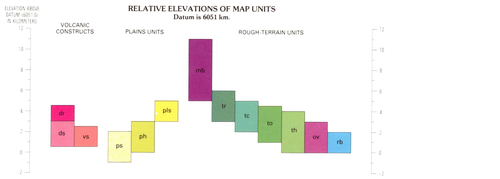
V 15M 90/0 G

1989

RELATIVE ELEVATIONS OF MAP UNITS

Datum is 6051 km.



NOTES ON BASE

This map of part of the northern hemisphere of Venus has been prepared to support planning and operations of the Magellan Mission to Venus. The data used to compile the base were obtained as a result of a joint American and Soviet Venus mapping project (Basilevsky and others, 1989), conducted under the auspices of the U.S.-U.S.S.R. Working Group on Solar System Exploration. Image information was taken almost exclusively from Venera 15 and 16 synthetic aperture radar (SAR) image mosaics provided by the U.S.S.R. (Rzhiga, 1987; Alexandrov and others, 1988). Ancillary data included Pioneer Venus radar altimetry (Pettengill, 1977; Pettengill and others, 1979), Venera 15 and 16 radar altimetry (Kotelnikov and others, 1984, 1985) and Earth-based radar images provided by the Arecibo Observatory (Campbell and Burns, 1980; Stofan and others, 1987).

ADOPTED FIGURE

The figure of Venus used for computation of this map projection is a sphere with a mean radius of 6051.0 (Kotelnikov and others, 1985).

PROJECTION

The Polar Stereographic projection is used for this map, with a scale of 1:15,000,000 at lat +40° and 1:18,261,561 at lat +90°. Due to the retrograde rotation of Venus, longitudes increase from west to east in accordance with usage of the International Astronomical Union (IAU, 1983).

CONTROL

Planimetric control is taken from the radar image mosaic provided by the U.S.S.R. that is based on the tracked position of the spacecraft (Akim and others, 1986; Tyuflin and others, 1989). According to current IAU convention, the 0° meridian passes through the center of a crater/lake feature, Eve (lat 32° S.), located within Alpha Regio, a feature of the southern hemisphere that is outside the area of this map (Masursky and others, 1980). No simple statement for accuracy can be given, but discrepancies as great as 10 km (0.1°) are likely to exist (Alexandrov and others, 1985; Tyuflin and others, 1989).

NOMENCLATURE

To avoid obscuring features on this sheet, place names are omitted. They are shown on the topographic map sheet I.-U.S. Geological Survey, 1989).

V 15M 90/0 G: Abbreviation for Venus; 1:15,000,000 series; center of sheet, lat 90° N., long 0°; geology (G).

GEOMORPHIC/GEOLOGIC MAP

Radar images and semicontrolled and controlled radar image mosaics were provided by the Institute of Radioengineering and Electronics and the Central Institute of Geodesy, Aerial Survey, and Cartography, Moscow (Alexandrov and others, 1985; U.S.S.R. Academy of Sciences, 1987, 1988; Burba, 1989b).

This map was compiled in 1989 from unpublished, Venera 15- and 16-based, 1:5,000,000-scale, preliminary geologic maps prepared by several authors from the Vernadsky Institute and the Geological Institute, U.S.S.R. Academy of Sciences, and from Moscow Lomonosov University. Several geologic units of the larger scale maps have been combined and revised to provide consistency of portrayal.

Detailed descriptions of the mapped units and their regional settings and geologic history are given in the papers listed below that are indicated by an asterisk. The other papers listed deal with principal questions of Venusian geology as revealed by Pioneer Venus and especially by Veneras 15 and 16.

MAP UNITS

The 13 units were mapped on the basis of characteristics observed primarily on Venera 15 and 16 SAR images, supplemented by data from Pioneer Venus and Earth-based radar images obtained by the Arecibo Observatory. The units represent different terrain types classified by physiographic expression. They are not rock-stratigraphic units and are not assigned to a time-stratigraphic system. Faults not expressed as specific landforms such as narrow depressions (grabens) or scarps are not shown.

VOLCANIC CONSTRUCTS

- **dr** — **Large, rough-surfaced, domical uplift**
- **ds** — **Large, smooth-surfaced, domical uplift**
- **vs** — **Shield volcano with smooth slopes**

PLAINS UNITS

- **ps** — **Smooth plains of lowlands**
- **ph** — **Hummocky plains of lowlands and foothills**
- **pls** — **Smooth plateaus**

ROUGH-TERRAIN UNITS

[Areas of tesserae (parquet) have rugged topography. They contain ridges and grooves that intersect from two or more directions and form diverse structural patterns]

- **mb** — **High mountain belt**
- **tr** — **Rhombic tessera**
- **tc** — **Chevron-shaped tessera**
- **to** — **Tessera containing orthogonal or parallel ridges and grooves**
- **th** — **Hummocky or chaotic tessera**
- **ov** — **Ovoid (corona)**—Circular system of ridges
- **rb** — **Ridge belt**
- **Geomorphic boundary**
- **Boundary, separating radar-bright and radar-dark areas**—Dots indicate brighter side. Interpreted as lava-flow boundary
- **Ridge**
- **Elongated prominence with gentle slopes**
- **Narrow depression**
- **Scarp**—Hachures point downslope
- **Arachnoid**—Circular complex with gently sloping concentric rims and radial lineaments
- **Volcano**
- **Caldera**
- **Impact crater (c) and ejecta (ce)**
- **Venera 9 landing site** (lat 31.7° N., long 290.8°)
- **Pioneer Venus 2 north probe landing site** (lat 59.3° N., long 4.8°)

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* References containing detailed descriptions of mapped units.

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