

MAPS OF PART OF THE VENUS NORTHERN HEMISPHERE:
 A JOINT US/USSR MAPPING PROJECT
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The United States and the Soviet Union have each sent separate spacecraft missions to Venus (the US launched Pioneer Venus in 1978 and the USSR launched Venera 15 and 16 in 1983). These missions returned complementary radar data concerning the surface features and topography of the planet. Venera 15/16 data provides topographic information about the north polar region of Venus, which was not obtained by Pioneer Venus, and high resolution (1-2 km/pixel) images for the northern 25% of the planet also not obtained by Pioneer Venus. Pioneer Venus data provides coarser resolution topographic information on parts of the planet not covered by Venera 15/16. The combination of the topographic data increases the horizontal resolution and the areal coverage of the planet's topography. The imaging data permits the surface morphology associated with the topography to be portrayed.

In March, 1988, at NASA Headquarters in Washington, D.C., an agreement on joint US/USSR project on mapping of the northern part of Venus was achieved. Venera 15 and 16 radar images and altimetric data will be used in the project together with Pioneer Venus altimetric data and Earth-based radar images from Arecibo Radar Observatory. During the discussions in Flagstaff in March-April, 1988, the details of the project were outlined.

The topography, imaging, and related data from Venus missions have been exchanged under the auspices of the US/USSR joint working group on Solar System Exploration. These data are being used to prepare a VENUS (VENERA/PIONEER VENUS) MAP SET which will be of significant general scientific value, and specific value in preparing for the upcoming US Magellan mission to Venus. The joint map products cover the northern latitudes imaged by Venera 15/16 (northward from $\sim 30^{\circ}\text{N}$) and some areas covered only by Pioneer Venus (northward from 20°N - the frame of the maps), and include:

- 1) PIONEER VENUS/VENERA TOPOGRAPHY MAP - Combining data sets, this product portrays topography with higher accuracy and more extensive coverage than it's possible with either mission alone. The map presents shaded relief base image, contour lines (c.i. 1 km), color coded elevation levels, feature nomenclature. The altimetry reconciliation was made by USGS.
- 2) VENERA RADAR IMAGE DIGITAL MOSAIC MAP - This product presents the image results of Venera mission in a format convenient for scientific investigators and Magellan mission planners. Features are "lighted" from the East.

Digital mosaic was made by Institute of Radioengineering and Electronics, Moscow, USSR Academy of Sciences.

- 3) VENERA SHADED RELIEF MAP- Combining the first two products and using US Earth-based radar data, a shaded relief portrayal of the surface of Venus is produced by P.M. Bridges, USGS, Flagstaff. Features are "lighted" from the West to fit upcoming Magellan mission images.
- 4) VENERA GEOLOGICAL MAP - This product shows the Soviet interpretation of the geology of the region. Terrain types and landforms are shown as listed in accompanied abstract [1]. The map also presents subdued shaded relief base, contour lines and abbreviated feature nomenclature.

The maps in the series are designed in common manner. They are in 1:15 000 000 scale and in polar stereographic projection. The institutions responsible for this project are: from USA - US Geological Survey, Flagstaff, AZ; from USSR - Vernadsky Institute, Moscow. These maps will be reviewed jointly and will be published by the USGS by early July, 1989. They will be distributed and displayed at the 28th International Geological Congress to be held in Washington, D.C., July 9-19, 1989.

REFERENCE: 1. Burba G.A. et al. (1989). Geologic mapping...
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