

THE CARTOGRAPHY OF VENUS WITH MAGELLAN DATA; R. L.

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Maps of Venus based on Magellan data are being compiled at 1 : 50,000,000, 1 : 5,000,000 and 1 : 1,500,000 scales. Topographic contour lines based on radar altimetry data are overprinted on the image maps, along with feature nomenclature. Map controls are based on existing knowledge of the spacecraft orbit; photogrammetric triangulation, a traditional basis for geodetic control for bodies where framing cameras were used, is not feasible with the radar images of Venus. Preliminary synthetic aperture radar (SAR) image maps have some data gaps and cosmetic inconsistencies, which will be corrected on final compilations. Eventual revision of geodetic controls and of the adopted Venusian spin-axis location will result in geometric adjustments, particularly on large-scale maps.

The first set of maps, being compiled on eight sheets, consists of radar image mosaics. Mercator and Polar Stereographic projections are used for this series; map scales are 1 : 10,000,000 at the poles and at latitudes $\pm 52^{\circ}30'5''$. A shaded relief version of each map in the set, derived from the Magellan radar altimetry, is being compiled by manual airbrushing, which restores an impression of topographic relief that is lost in the image mosaics. Base maps for systematic geologic mapping will be made at 1 : 5,000,000 scale; this series consists of 62 quadrangles in Mercator, Lambert Conformal, and Polar Stereographic projections. In addition to the SAR mosaics and the altimetric shaded relief and contour maps, this series includes a novel type of high-resolution, shaded relief image created by digital processing of oppositely illuminated SAR image pairs. This technique is described in an accompanying abstract [1]. Full-resolution SAR image mosaics are being compiled digitally and reproduced photographically at 1 : 1,500,000 scale in Sinusoidal projection. This map series is further described in an accompanying abstract [2].

Sets of synthetic stereograms of SAR images of the entire planet are being made by introducing parallax derived from altimetry measurements into the images [3]. Each stereo set comprises a Magellan C1-MIDR mosaic ($\sim 15^{\circ}$ square in Sinusoidal projection) and two stereo companions with different degrees of vertical exaggeration. Thematic maps in which the Magellan altimetry, emissivity, normal reflectivity, and RMS-slope datasets are color coded and merged with the SAR image are also being produced and can be viewed stereoscopically in combination with the gray-scale synthetic stereo images. The stereo and thematic images are being distributed as 25 cm \times 25 cm photographic products with 225 m per pixel and 675 m per pixel resolutions, respectively. Special-purpose, non-cartographic products, including oblique perspective views of the Venusian surface, are also being produced for scientific analysis [4]. Finally, a 16-inch-diameter globe of Venus (approximate scale 1 : 3,000,000) has been produced. The image data for this globe is a combination of the Magellan SAR and digitally produced shaded relief.

A regional network of feature names is being prepared to support scientific communication, and is described in an accompanying abstract [5]. Experience with the typical number of named features per unit area on other planets indicates that names for 4000 or more features on Venus are likely to be required in the coming decade.

References Cited [1] KIRK, R. L. (1993) Separation of topographic and intrinsic backscatter variations in bistatic radar images: A "magic airbrush," this volume. [2] KIRK, R. L. *et al.* (1993) Global Magellan image map of Venus at full resolution, this volume. [3] BATSON, R. M., *et al.* (1978) Synthetic stereo and LANDSAT pictures, *Photogramm. Eng. Remote Sens.*, **42**, 1279-1284. [4] KIRK, R. L., *et al.*, (1992) Enhanced visualization for interpretation of Magellan radar data: Supplement to the Magellan special issue, *J. Geophys. Res.*, **97**, 16371-16380. [5] RUSSELL, J. F., AND G. G. SCHABER (1993) Named Venusian craters, this volume.