DIGITAL MOSAIC AND ELEVATION MODEL OF CENTRAL VALLES MARINERIS, MARS; L. M. Bertolini, A.S. McEwen, U.S. Geological Survey, Flagstaff, AZ 86001

We have geometrically controlled 143 Viking Orbiter 1 images to produce a digital mosaic of the central Valles Marineris region of Mars. The mosaic covers most of Ophir, Candor, and Melas Chasmata and covers approximately +1° to -15° latitude and 65° to 75° longitude. The image frames are PICNOS 910A01-917A20, red filter and nadir looking; illumination and phase angles both range from 55 to 65 degrees. Noise removal by box filtering [1], radiometric correction, and all other image processing were done by using the Planetary Image Cartography System (PICS). The image frames were transformed into sinusoidal Equal Area projections at a scale of 1/1024 degree/pixel (approximately 58 m/pixel) prior to mosaicking. The geometric control and format are consistent with those of the Mars Digital Image Model project [2,3].

We obtained measurements of landslides and other features from the controlled images using the photoclinometric program TVPROF (on single images) and the program TVSTEREO on pairs of images. For TVPROF [4], which produces topographic profiles, we used a variety of photometric models and parameters to constrain the slope values. TVSTEREO calculates relative heights. Measurements include those of landslide drops, deposit thicknesses, and slopes of canyon walls. The data will be used to refine estimates and to make additional ones of landslide volumes and yield strengths [5].

In addition, we prepared a digital elevation model of the region from -3° to -7.6° latitude and from 70° to 75° longitude from a 1:500,000-scale (200-m contour interval) topographic map [U.S.Geological Survey, work in progress]. The topographic map was first digitized into vector format, then transformed into raster format of the same map projection and scale as the digital mosaic; the contour lines were then interpolated to produce the digital elevation model. From the coregistered mosaic and digital topographic data, synthetic oblique views were generated from the north, south, east, and west. When producing an oblique view, we can specify viewpoint elevation and azimuth and vertical exaggeration. The oblique views provide versatile imaging of geologically important areas and their topography. These data will eventually be used to make 3-dimensional movies of the terrain.

REFERENCES

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