NEW GROUND-BASED RADAR IMAGES OF VENUS;

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High resolution images (~8km) of Venus were made between 1972 and 1977 using the Goldstone radar system (1-3). Similar observations were made in 1978, 1980 and 1982 that either extend the coverage or were specifically targeted to view known surface features. Fourteen new images have been added to the set which now contains 37 images each covering about $1.5x10^6$ km^2 of surface. During the period from 1982 to 1986, the radar system was redesigned to provide much higher resolution images (~1km) under favorable conditions. Observations were made on 12 days near the inferior conjunction of 1986. Two of these observations have been processed. All observations consist of a reflectivity image and a corresponding altimetry map. Table 1 provides a summary of the locations, coverage, resolution and dates of acquisition of the new data.

The images are located close to the equator in a longitude girdle including the southern part of Beta Regio on the west. The data extend to within 6000 km of Aphrodite Terra on the east. The areas covered by the Goldstone data were mapped as part of the rolling plains or lowlands provinces by Masursky et al. (4) from Pioneer Venus altimetry. Incidence angles for the data range from 0 to 8 degrees. The images show a number of radar-smooth mounds, numerous circular depressions, anomalously bright or dark regions, long ridges and two craters having bright ejecta. The images of Jan. 31, 1982 and Feb. 4, 1982 show two views of a 700 km long ridge viewed from different sub- radar points such that the slope induced scattering is eliminated. The ridge can be identified in the altimetry. Some near-slope brightness enhancement is seen in the Jan. 31 image where the slope faces the sub-radar point. However, the entire feature is darker than average in the Feb. 4 image where the ridge is radial to the sub- radar point. The ridge, as a whole, must have lower reflectivity than the adjacent terrain.

The most remarkable feature is seen in the image of July 2, 1980. This bright complex cannot be explained with slope- induced scattering or variations in surface roughness. A Fresnel reflection coefficient near 0.5 to 0.6 is required over most of the feature to account for the increase in radar albedo. The new high resolution images also show regions of high reflectivity that cannot be attributed to slope-induced scattering or surface roughness. The large variation in reflectivity over small lateral and topographic distances suggests that it is not an elevation-dependent weathering effect. The radar bright material seen in the Nov. 16, 1986 image decreases in reflectivityfrom west to east. The Nov. 16 image also contains a 12 km diameter circular feature that may be an impact crater with an unusually bright rim and a dark interior. The image of Nov. 27, 1986 contains distinctive parallel sets of crossing linear features, spaced approximately 20 km, similar to parquet terrain seen in the Venera 15-16 images.

These low incidence-angle Goldstone images will be of great interest for interpreting Magellan images since they complement the 40-50 degree incidence angle Magellan images that will be acquired in the equatorial region of Venus.

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References:
1) Rumsey *et al.* (1974) *Icarus,* 23, 1. 2) Goldstein *et al.* (1976) *J. Geophys. Res.,* 81, 4807. 3) Jurgens *et al.* (1980) *J. Geophys. Res.*, 85, 8282. 4) Masursky *et al.* (1980), *J. Geophys. Res.*, 85, 8232.

YR	MON	DAY	PXL/DEG	LONG	IAU LONG	LAT	
78	OCT	28	20	-53.867	-50.207	7.145	* not done at full resolution
78	NOV	03	20	-47.990	-44.330	6.360	"
78	NOV	10	20	-41.839	-38.179	4.932	"
78	NOV	17	20	-35.270	-31.610	3.214	"
80	JUN	08	15	-43.713	-40.053	-0.687	"
80	JUN	14	15	-38.477	-34.817	0.653	* targetted for 72 JUN 20
80	JUN	22	15	-31.337	-27.677	2.349	
80	JUN	27	15	-26.156	-22.496	3.185	* short observing period
80	JUL	02	15	-20.060	-16.400	3.810	
80	JUL	11	15	-6.601	-2.941	4.435	
82	JAN	16	15	-38.636	-34.976	-5.678	* bistatic most of the track
82	JAN	23	15	-32.529	-28.869	-6.942	* short observing period
82	JAN	31	15	-24.839	-21.179	-7.596	
82	FEB	04	15	-20.225	-16.565	-7.611	
86	NOV	16	100	-31.022	-27.362	3.183	* 1.3 km resolution
86	NOV	27	50	-16.455	-12.795	0.611	* 2.2 km resolution

Table I. Observation date, longitude and latitude of the sub- radar point, resolution and angular coverage. Note, to get IAU longitude, add 3.66 degrees to Long. above. The accuracy of this offset is ~0.03 deg. The changes from day to day in location should be more accurate than the absolute numbers.

The longitude and latitudes are based on a pole of:

PERIOD IN DAYS	=	243.008 DAYS
RIGHT ASCENSION	=	92.200 DEGREES
DECLINATION	=	-66.845 DEGREES

using 1950.0 as a reference. This pole is identical with that used for mapping of all previous images in the set and has been maintained to provide continuity with the earlier image set.