MAGELLAN OBSERVATIONS OF EXTENDED IMPACT CRATER RELATED DEPOSITS ON THE SURFACE OF VENUS; D.B. Campbell and N.J.S. Stacy, Department of Astronomy, Cornell University, Ithaca, New York 14853; W. Newman, Departments of Earth and Space Sciences, Astronomy and Mathematics, University of California, Los Angeles, CA 90024; R.E Arvidson, McDonnell Center for the Space Sciences, Department of Earth and Planetary Sciences, Washington University, St. Louis, MO 63130.

A total of 54 parabolic-shaped and 9 approximately circular-shaped extended, impact crater-related features have been found in Magellan synthetic aperture radar (SAR) and emissivity data covering 92% of the surface of Venus. The parabolic features are, with six exceptions, oriented EW with the apex to the east and the impact crater located just west of the apex. Dimensions of both the parabolic and circular features range from several hundred to about two thousand kilometers and are loosely correlated with the sizes of the 'parent' crater.

They were first identified in the initial surface emissivity data derived from Magellan radiometry measurements as areas of lower surface emissivity [1], but the great majority are only clearly visible in the SAR imagery. An example of an extended, impact crater-related feature with nested radar bright and dark parabolas is shown in Figure 1. The floor of almost all the 'parent' craters have high specific radar backscatter cross sections (i.e. they are bright in the SAR imagery) relative to their surroundings and tend to have low emissivities. A survey of impact craters with diameters $\geq$15 km over $\sim$40% of the surface of Venus show that approximately one-third appear to have bright floors and about half of these have an associated parabolic feature which can be observed in the SAR or emissivity data. No features have been found which overlie the parabolic features indicating that they are amongst the youngest features on the surface of the planet. This suggests that most fresh impact craters may have radar bright floors, and that the darker floors observed for most impact craters are the result of later modification processes.

A model for the formation of the parabolic features has been developed based on the injection of small particles into the upper atmosphere at the time of impact and their transport to the west by the EW zonal winds. Fitting of a small perturbation scattering model to the measured average scattering law for the parabolic features placed an upper limit of about 0.6 cm on the wavelength scale (12.6 cm) surface roughness and, hence, of 1 to 2 cm on the largest particle sizes of interest. Fallout times from 50 km in the Venus atmosphere for particles of this size are about two hours, allowing westerly drifts of several hundred kilometers for zonal winds of 50 to 100 m sec^{-1}. Measurements of the change in backscatter cross section of features overlaid by these extended ejecta deposits, are consistent with deposit depths of a few centimeters to 1 or 2 meters.

[1] Arvidson et al., (1991), *Science*, **252**, 270-275.

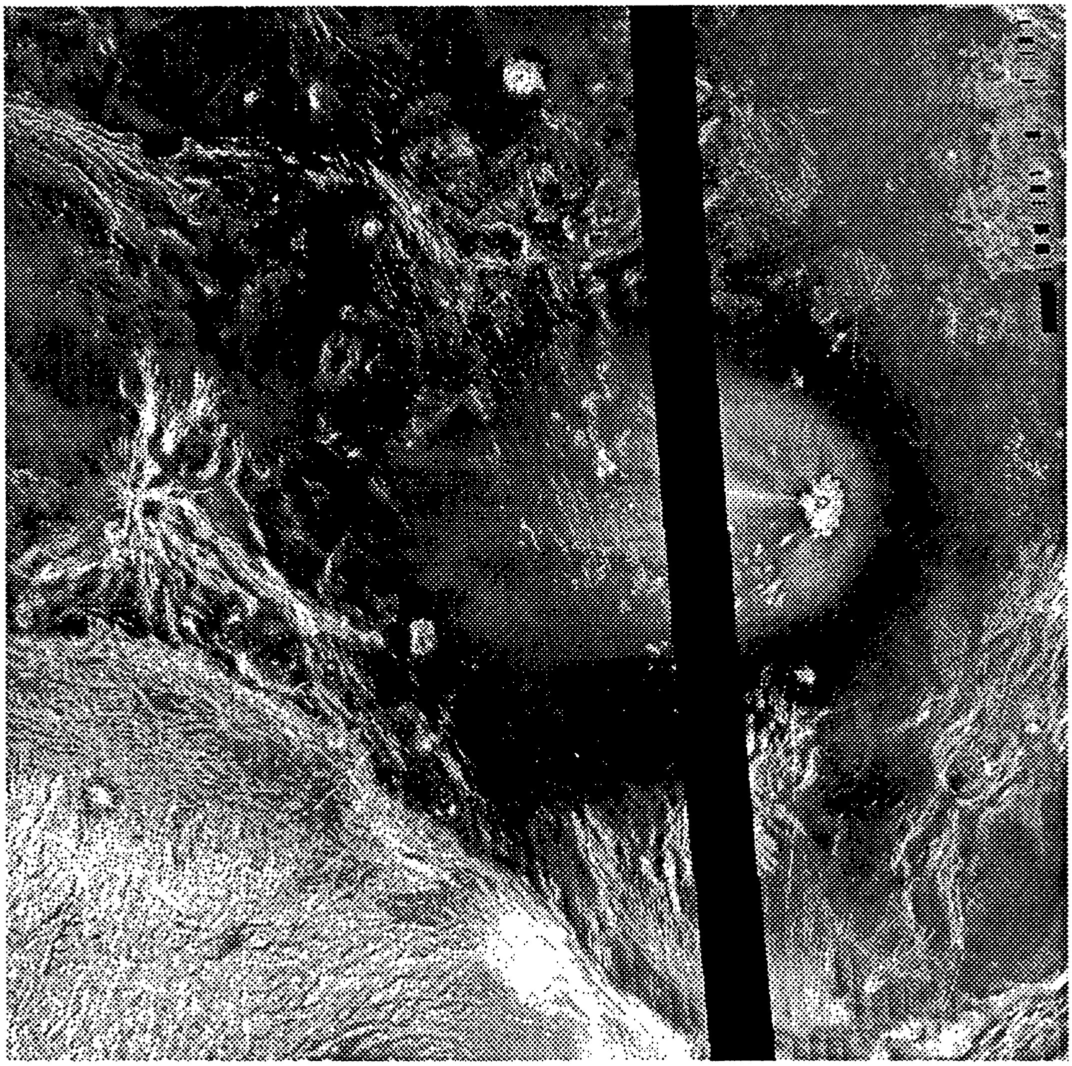

Figure 1: Magellan synthetic aperture radar image of the nested radar bright and dark parabolas associated with the crater Adivar (30km diameter, 8.9°N 76.2°E). The outer dark parabola has dimensions 1020km by 860km and an area of 0.76 x 10^6 km^2. Adivar is located 175km west of the apex of the dark outer parabola. The inner bright areas have higher relative backscatter cross section than the surrounding terrain. The EW streaks may be aeolian features and the bright 'jet' extending west of Adivar may be associated with the passage of the incoming body through the atmosphere.