SURFACE MODIFICATION OF VENUS AS INFERRED FROM MAGELLAN OBSERVATIONS OF PLAINS AND TESSERAE. **R.E. Arvidson[1], R. Greeley[2], M. Malin[3], R.S. Saunders[4], N. Izenberg[1], J.J. Plaut[4], E. Stofan[4] (1) McDonnell Center for the Space Sciences, Department of Earth and Planetary Sciences, Washington University, St. Louis, MO 63130 (2) Department of Geology and Center for Meteorite Studies, Arizona State University, Tempe, AZ 85287-1404 (3) Malin Space Science Systems, 3535 General Atomics Court, Suite 250, San Diego, CA 92121 (4) Jet Propulsion Laboratory, 4800 Oak Grove Drive, Pasadena, CA 91109.**

Magellan radar specific backscatter cross sections, Fresnel power reflection coefficients corrected for diffuse-scale roughness, quasi-specular scale root-mean-square slopes, and elevation data covering lava flows in Sedna Planitia, and various features in Alpha Regio and the western portion of Ovda Regio were analyzed to determine the nature and extent of surface modification. The radar backscatter data were also compared to calibrated airborne radar data for terrestrial lava flows, alluvial fans, and a playa. Overall the Magellan data are consistent with a planet that continues to produce landforms by volcanism, tectonism, and impact events. Weathering, mass wasting, aeolian activity, and impact ejecta emplacement operate on a continuing basis and are capable of modifying the upper several meters for plains and tens of meters for tesserae over the several hundred million year average age of the surface. Evidence for these assertions includes: (a) Stratigraphically young lava flow units in Sedna Planitia that have radar signatures similar to those found for both a'a and pahoehoe flows on Earth, and older Sedna flow units with backscatter characteristics similar to terrestrial flows that have been degraded by mass wasting and burial by aeolian deposits. The Sedna flow units are superimposed on plains that have had initial flow textures removed by surface processes; (b) During impact events crater ejecta is spread as parabolically-shaped deposits over several hundred thousand km^2 by zonal high altitude E-W winds. Modeling of the microwave properties demonstrates that the deposits are typically centimeters in thickness. They are removed by atmosphere-surface interactions and volcanism, since only 5% of the craters retain parabolic ejecta patterns; (c) Reflection coefficients for tesserae in Alpha Regio and western Ovda Regio below ~6054 km radius are relatively low (<~0.08) and consistent with the presence of an unconsolidated debris layer. The lack of scree slopes on these tesserae implies that mass wasting is not currently a major surface process because these are mountainous areas morphologically mature and relatively stable. Scree deposits are evident in other areas with pristine-appearing cliffs; (d) Elevated (>6054 km radius) tesserae and plains have enhanced reflection coefficients (>0.20), implying that elevation-dependent atmosphere-surface reactions (as opposed to enhanced erosion on tesserae slopes) control the presence of high dielectric materials. High reflectivity plains in western Ovda Regio below 6054 km radius merge with normal-appearing plains at ~6053.5 km. These bright plains are interpreted to be covered with high reflectivity debris shed from the adjacent tessera and blown downhill. The existence of these deposits implies that weathering of high reflectivity materials occurs at rates that are lower than the rate of addition by mass wasting and aeolian activity, i.e. reverse reactions occur over geological timescales (Ma years).