BACKSCATTER CROSS SECTIONS OF VENUSIAN FEB CRATER DEPOSITS ;
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Specific radar cross sections (σ_0) of ejecta deposits and surrounding plains associated with three fluidized ejecta blanket (FEB) craters (Addams, Isabella and Markham) are part of a comprehensive multiple-cycle study of FEB crater surface properties using Magellan data **[1,2]**. Using digital unit mapping techniques, σ_0 values for morphologically defined ejecta units were obtained from Cycle 1 and 2 SAR imagery. Comparison of these backscatter curves (Figure 1) to those for terrestrial lava surfaces and standard scattering functions **[3]** constrains estimates of relative surface roughness and/or compositional effects.

Units. FEB flow, ballistic, and transitional material units are used here. FEB flow materials are radar-bright, fluvial-like materials emanating from or near the crater rim and exhibit streamlined features **[e.g., 4,5]**. Ballistic ejecta are intermediate to radar-bright hummocky materials extending radially from the crater rim, possibly with lobate margins, and may occur as dispersed materials overlying the plains. Transitional ejecta are very radar-bright, hummocky materials forming gradational contacts with ballistic and/or FEB flow materials (similar to the "proximal" unit of **[4]**). Simulated S-band AIRSAR data for sites in the Lunar Crater volcanic field are also shown in Figure 1 **[6]**. The young Blackrock a'a flow shows a slightly flatter but higher return backscatter curve than the mantled flow, which has been smoothed by aolian fill. The degraded flow has undergone additional weathering to preferentially remove small-scale structures and so exhibits the steepest, lowest return terrestrial curve. This is similar to the Venus planetary average (Muhleman) curve and higher than the Hagfors scattering curve.

Addams. The σ_0 curve for the Addams plains units falls well below the average curve and exhibits the steepest slope, consistent with the plains being smoother (at wavelength scales) than the other surfaces shown. The curve for the FEB flow falls along the planetary average, while the ballistic and transitional ejecta fall above the average and show increasingly flatter curves respectively. The transitional ejecta thus appear roughest at this scale, although the overlap of the σ_0 standard deviations might suggest greater parity between ejecta roughnesses.

Isabella. The low σ_0 values of the plains show the steepest slope and fall closest to the Hagfors curve, while the ballistic ejecta fall below the Muhleman average curve and have a more shallow slope. The inclusion of intervening plains materials within the mapped ballistic ejecta is responsible for its relatively low σ_0 values. The transitional ejecta fall above the average curve and have a steeper slope than all but the plains. The FEB flow appears anomalous since it has lower σ_0 values but an evidently rougher surface (flatter σ_0 curve) than the higher σ_0-valued transitional ejecta. It may be that while the heavily channelized northern FEB section is responsible for the flat (rough) curve, the southern, parabola-mantled FEB **[2]** suppresses the overall strength of the σ_0 values. This occurs in much the same fashion for the terrestrial mantled flow where the σ_0 values have been suppressed relative to the Blackrock a'a flow without substantially altering the slope of the scattering curve.

Markham. Here the plains again fall below the average Muhleman curve and exhibit the steepest slope. The FEB flow shows the flattest curve (roughest surface), followed by the transitional ejecta and the ballistic ejecta, respectively. The transitional ejecta show slightly higher σ_0 values, while the FEB flow and ballistic ejecta σ_0 averages appear to undergo a "contrast reversal" suggesting that the FEB flow probably has greater wavelength-scale roughness and that the ballistic ejecta are slightly more quasi-specular scattering **[3]**.

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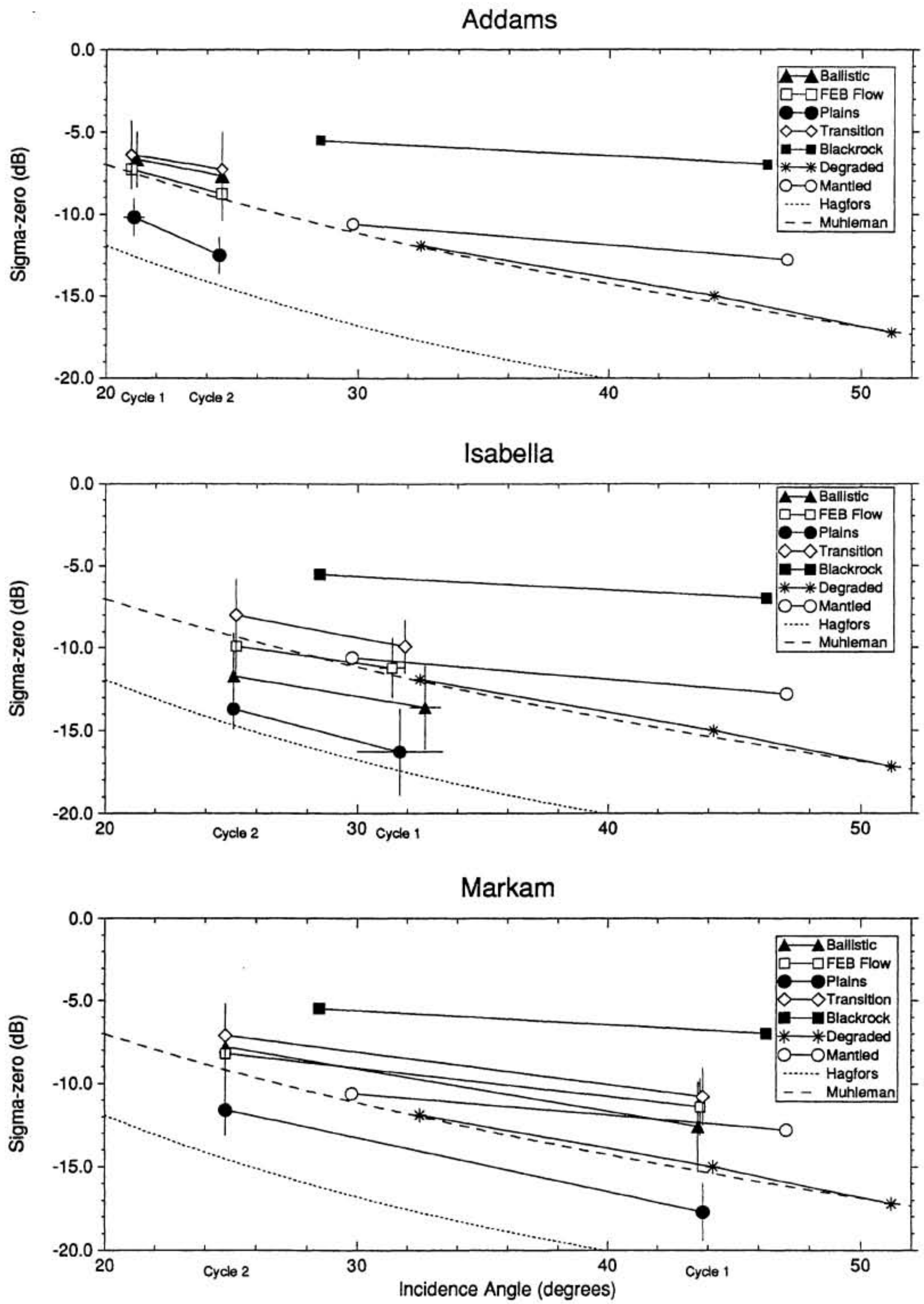

Figure 1. Specific backscatter cross section curves (σ_0) for ejecta and plains units associated with FEB craters Addams, Isabella, and Markham from Cycle 1 and 2 SAR image data. Error bars represent standard deviations about the mean σ_0 values and incidence angles for the entire unit as derived from the unit mapping procedure [1]. Blackrock, Mantled, Degraded represent terrestrial lava surfaces from the Lunar Vocanic field [6]. Also shown are the planetary average (Muhleman) curve and a representative Hagfors function (derived using an uncorrected Fresnel reflection coefficient of 0.109 and rms slope of 2.77°) [3].