Simple Power Law for Transport Ratio with Bimodal Distribution of Coarse Sediment CHRISTOPHER THAXTON, Appalachian State University, JOSEPH CALANTONI, Naval Research Laboratory — Using a discrete particle model, we have simulated sheet flow transport of coarse bimodal sediment distributions in the bottom boundary layer over a range of oscillatory waves and steady currents. The ratio of large grain to small grain diameter was varied as 5:4, 3:2, and 2:1. For each bimodal distribution, the mass ratio M_L/M_S (M_L and M_S are the masses of large and small grains respectively – the total mass was fixed for all runs) was varied from 1/9 up to 9/1. We find that, independent of wave and current forcing for the range of conditions considered, the ratio of large to small grain time-average transport rate obeys the power law $Q_L/Q_S = C(M_L/M_S)^k$, where Q_L and Q_S are the time-average transport rates of the large grains and small grains respectively and C and k are regression constants. A linear regression in log space (including 81 different simulations per diameter ratio) suggests that $k \approx D_L/D_S$ with $R^2 >0.9$. The robust nature of the results suggests that the new power law may have a broad range of applications for shear flows of bimodal granular mixtures.

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