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Comparative study of soil erodibility and critical shear stress between loess and purple soils

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Abstract

Loess and purple soils are two very important cultivated soils, with the former in the loess region and the latter in southern sub-tropical region of China, featured with high-risks of erosion, considerable differences of soil structures due to differences in mineral and nutrient compositions. Study on soil erodibility (K_r) and critical shear stress (τ_c) of these two soils is beneficial to predict soil erosion with such models as WEPP. In this study, rill erosion experimental data sets of the two soils are used for estimating their K_r and τ_c before they are compared to understand their differences of rill erosion behaviors. The maximum detachment rates of the loess and purple soils are calculated under different hydrodynamic conditions (flow rates: 2, 4, 8 L/min; slope gradients: 5°, 10°, 15°, 20°, 25°) through analytical and numerical methods respectively. Analytical method used the derivative of the function between sediment concentration and rill length to estimate potential detachment rates, at the rill

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