



Particle Size Distribution of Eroded Material from Semi-Arid Soils

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The particle size distribution (PSD) of eroded sediments can be used to deduce potential nutrient losses, pollution hazards and the redistribution of soil components over the landscape. We studied eroded sediments from three semi-arid soils, with different clay contents, that were wetted at a slow (2 mm h^{-1}) or a fast (64 mm h^{-1}) wetting rate before being subjected to 60 mm of simulated rain during which eroded sediments were collected at 6 mm of rain intervals. The PSD of the eroded material $<250 \mu\text{m}$, which comprised $>99.5\%$ of the sediments, was determined with a Horiba LA-910 laser particle size analyzer. For each soil, the frequency curves for particle size of the eroded sediments and the parent soil material were generally of a similar shape. However, the PSDs of the eroded sediments exhibited, in general, higher clay contents compared with the parent soils. In the fast wetting treatment the cumulative enrichment in clay size fraction of the eroded material was inversely related to the clay content of the parent soil, and was comprised of 28.5, 26.6, and 22.8% more clay than in the parent material of the loam, sandy clay and clay soils, respectively. Generally, total clay loss was higher from fast wetted soils while, proportional to clay content in the parent material, clay enrichment was higher from slow wetted samples. The impact of rain depth (i.e., degree of seal development) on the PSD of the eroded sediments depended on soil texture. Enrichment of the eroded material by clay size particles took place mostly during the seal development stage in the loam, but could not be readily associated with specific stages in seal development in the clay and sandy clay soils. The large observed losses of clay material due to erosion, with their associated negative aspects, re-emphasize the need to employ erosion control measures in soils from

semi-arid regions.