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Tracing sediment movement on semi-arid watershed using rate Earth elements

V. Polyakov (1) and M.A. Nearing (2)

(1) USDA-ARS Tucson, AZ, USA (mark.nearing@ars.usda.gov), (2) Univ. Arizona, Tucson, AZ, USA (viktor.polyakov@ars.usda.gov)

A multi-tracer method employing rare earth elements (REE) was used to determine sediment yield and to track sediment movement in a small semiarid watershed. A 0.33 ha watershed near Tombstone, AZ was divided into five morphological units, each tagged with one of five REE oxides. Relative contribution of each unit to the total sediment yield was determined by collecting runoff and sediment, and the spatial redistribution of sediment was determined from sampling the soil surface. Average sediment yield was 1.0 t ha-1 y-1 from the entire watershed, but varied between 0.1 t ha-1 y-1 from the upper slope to 5.0 t ha-1 y-1 from the lower channel. Little re-deposition occurred in the channels indicating an effective transport system. The erosion pattern and rates were in agreement with the current morphology of the watershed, which has a well developed channel network.