



Determination of connectivity in spatial patterns of soil erosion and deposition using Rare Earth Element tracers

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We present experimental results of spatial patterns of soil erosion and deposition derived using 10 Rare Earth Element (REE) oxides as sediment tracers. The experiments were carried out on the TRACE laboratory slope measuring 2.5 m wide by 6 m long with a soil depth of 0.3 m. Soil plots were tagged in 15 different locations using multiple REE in order to characterize in detail the sediment sources and pathways across a break in slope with a gradient of 15° declining to 2°. Multiple soil samples after the erosion event enabled the detailed characterization of the spatial patterns of deposition from different sources on the steep element, the shallow element and at the interface between the two. We applied the geostatistical connectivity function on all the REE-derived spatial data in order to determine the degree of connectivity between the various sources and sinks over the entire slope. The results demonstrate the potential of using REE for tracing erosion and deposition and for producing spatial data that can be combined with geostatistical functions, such as connectivity, to generate a detailed spatial understanding of sediment patterns from source to sink.