Using Rare Earth Element Tracers in a Watershed Soil Erosion Study. (S06-polyakov152952-Poster)

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Abstract:

Conservation planning and validation of erosion models require spatially distributed information about sediment movement on the watershed. Such information can be obtained through the use of sediment tagging. A 0.68 ha watershed was divided into six morphological units. Each unit was tagged with a different rare earth element (REE) oxide. Soil samples were collected and soil translocation evaluated using a proportional method. To quantify the mean background value of REE in the soil with an allowable error of 5% at a 95% confidence level, 10 random samples were needed. While the average soil loss on the watershed from the time period of testing was 6.1 t ha-1, local rates varied between 46 t ha-1 of loss to 50 t ha-1 of soil gain. Concave landscape elements with steeper slopes experienced the highest net erosion rates, while the shoulder slope was relatively stable. The largest deposition occurred on the toeslope. The sediment budget at a specific location was itemized as: 1) the soil which left the watershed with runoff, 2) soil from this location that was re-deposited on lower positions, and 3) soil originating from the upper positions and deposited at this location.

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