

Estimation of the spatial distribution of soil erosion in the hilly area of Sichuan, China

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Abstract The hilly area of Sichuan (China) has suffered from soil erosion as a result of the intensive agriculture and steep topography. Many different methods have been used for the estimation of soil erosion and no clear consensus about erosion rates and subsequent sediment delivery ratios (SDR) has been reached. In this study, the Universal Soil Loss Equation (USLE) with different parameter estimation methods was applied to two river basins (i.e. Weichenghe (WCH) and Lizixi (LZX)) with the help of GIS techniques. The results were compared with those of previous studies based on remote sensing, erosion plots or the ¹³⁷Cs technique. The main results can be summarized as: (1) different rainfall erosivity estimation methods generate vastly different results; (2) using two-dimensional slope length produces higher soil erosion rate estimates and lower SDRs than the conventional approach in USLE; (3) the average annual soil erosion rates for WCH and LZX were estimated at 706 t km⁻² year⁻¹ and 3040 t km⁻² year⁻¹, respectively, and the corresponding sediment delivery ratios at 0.27 and 0.38; and (4) the high erosion rates reflect the high altitude and intensive agricultural land use.

Key words USLE; rainfall erosivity; soil erosion rate; spatial distribution