

Identification of priority areas for soil erosion governance and analysis of control factors based on different karst landform types

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Abstract

Soil erosion is the prominent ecological and environmental problem in karst area of southwest China, which seriously restricts the sustainable development of the region. Determining the priority areas of soil erosion governance and its driving factors can significantly improve the efficiency of prevention and control. However, at present, there are few researches on the priority areas of governance that comprehensively consider karst landform types and management requirements. Based on the minimum administrative unit and karst landform types, this study identified the priority areas of soil erosion control by comprehensive use of spatial clustering method and geographic detectors, and quantified the driving factors and their interactions. The results indicated that: (i) Priority areas within the smallest administrative unit are clustered in the southwest, southeast and northeast of the study area, overlapping with areas of intense erosion; Geomorphological differentiation of multi-factor gradient risk zones is obvious, but the areas with strong erosion are all controlled by bedrock exposure rate, altitude and slope aspect. (ii) The soil erosion in the priority area is concentrated and intense. By treating the priority area, which accounts for 12.77% of the total area, soil erosion can be reduced by 27.66%. (iii) The driving factors have a strong dependence on karst landforms, showing obvious differences in different karst landform areas; Interaction of factors, especially the interaction between human disturbance factors and natural influence factors, can significantly enhance the explanatory power of soil erosion. The research results have important theoretical significance for the planning and control of soil and water loss in karst areas.

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