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研究报告

黄土高原景观格局与水土流失关系研究

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摘要

采用DCCA排序法对黄土高原腹地泾河流域12个子流域的景观格局与流域水土流失关系进行了定量分析.结果表明,DCCA排序的前4轴分别与农业用地比率、景观多样性指数、森林比率显著相关.各子流域的水土流失特征具有明显的梯度变异.在森林比率占65%的三水河子流域，景观相对简单、多样性低,流域年径流量大、输沙小、含沙量低，径流相对稳定；随着森林比率减小，农业用地比率增大，景观多样性升高，产流系数增高，径流深度、输沙量和含沙量增大；在森林比率很低、农业用地53.41%的洪河子流域，景观格局复杂、多样性较高，河流含沙量高、输沙率大，月输沙和径流变异极大；在农业用地比率减小，其他景观类型比率增大，景观相对简单的环江上、下游子流域，输沙量和含沙量减小，但输沙和径流的年际变化极大.排序分析结果较清晰地解释了黄土高原典型地区水土流失特征沿景观梯度的变化规律.

关键词 水土流失,景观格局,DCCA,子流域,泾河

分类号

Relationships between soil and water loss and landscape pattern on Loess Plateau

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Abstract

Based on the theories of detrended canonical correspondence analysis (DCCA),12 soil and water loss indices (“species”) and 7 landscape indices (“environmental factors") were adopted to quantitatively analyze the effects of landscape pattern on the soil and water loss in Jinghe River basin on Loess Plateau.The results showed that the first four DCCA axes were significantly correlated to agricultural land ratio,landscape diversity index, forest land ratio,and landscape contagion index.The characteristics of soil and water loss changed obviously with landscape pattern gradient, e.g.,Sanshuihe watershed with a forest cover larger than 65% and low landscape diversity had a big and stable runoff,but small sediment and low river sand content.The runoff generation coefficient and runoff depth as well as the sediment transport and river sand content increased with the increasing agricultural land ratio and landscape diversity and the decreasing forest land ratio.As for Honghe watershed with a very low forest cover but high agricultural land ratio (53.41%),and with a relatively high landscape diversity and complex landscape pattern,it had the highest river sand content and the biggest sediment transport,and its monthly runoff and sediment transport varied markedly.The soil and water loss in the Upper-Huan,Down-Huan and Dongchuan watersheds with smaller forest and agricultural land ratio and relatively simple landscape pattern was smaller than that of the watersheds with dominated agricultural land.

Key words Soil and water loss Landscape pattern DCCA Watershed Jinghe River Basin

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