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Study on the changes of soil erosion and sediment transport based on RUSLE model in Zhifanggou watershed, China

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In this paper, based on the integrated use of precipitation data from 1981 to 2004, LANDSAT TM images in 2000, 2005 and 2010, terrain parameters and soil compounds in Zhifanggou watershed, Pingliang city, Northwestern China's Gansu Province, the changes of sediment yield and sediment transport are assessed by using Revised Universal Soil Loss Equation (RUSLE) and Geographical Information Systems (GIS). The factors of RUSLE model include rainfall erosivity, soil erodibility, slope length and steepness, vegetation cover and management, and supporting practices. According to the calculation method of each factor, the modulus of soil erosion and sediment yield are conducted. The results show that the average modulus of soil erosion is 1223.8 t/ (km^2·yr), 1118.0 t/ (km^2·yr) and 874.9 t/ (km^2·yr), annual soil loss is 23129.80 t, 21130.20 t and 16535.61 t in 2000, 2005 and 2010 respectively. The measured average erosion modulus is 1580.5 t/ (km^2·yr) and 1376.8 t/ (km^2·yr), and the measured annual soil loss is 29871.50 t and 26021.50 t in 2000 and 2005. The calculated results are basically consistent with the measured values. From 2000 to 2010, the amount of soil erosion was reduced yearly, the main erosion status in three periods is tiny erosion and light erosion, the moderate erosion is less. The area of tiny erosion is increasing, the area of other erosions is decreasing. It shows that total erosion intensity is small, erosion intensity is transformed to a smaller level. The analysis result in 2010 demonstrates that the serious erosion and mighty erosion disappeared. This describes that the implementation of comprehensive measurements of soil and water conservation in Zhifanggou watershed achieved remarkable effects, and effectively alleviate soil erosion conditions.