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基于GIS/RS和USLE鄱阳湖流域土壤侵蚀变化

Soil erosion changes based on GIS/RS and USLE in Poyang Lake basin

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英文关键词:soil erosion water and soil conservation remote sensing the Poyang Lake basin sediment yield universal soil loss equation (USLE)

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中文摘要:

将空间信息技术（RS和GIS）和通用土壤流失方程（USLE）相结合对鄱阳湖流域土壤侵蚀量进行计算。分别利用1990年和2000年TM/ETM+影像分类得到两期土地利用/覆盖类型图，结合鄱阳湖流域数字高程模型（DEM）、土壤类型分布图和流域降雨资料分别获取USLE模型中各因子值的空间分布，最后计算流域2个年份的土壤侵蚀空间分布图。研究表明：鄱阳湖流域土壤侵蚀区域主要分布在赣江上游，信江上游，抚河上中游和修水上游地区；鄱阳湖流域1990年和2000年大范围土地经受着Ⅰ级微度与Ⅱ级轻度侵蚀，其侵蚀面积之和分别占流域面积的97.38%和97.30%；而流域产沙主要来源于Ⅱ级轻度侵蚀和Ⅲ级中度侵蚀，所占土壤侵蚀总量分别为58.16%和51.20%，其中中度以上等级的侵蚀对产沙量的贡献是不可忽视的；从1990年到2000年土壤侵蚀等级变化呈现了由中等级侵蚀（Ⅱ级轻度侵蚀和Ⅲ级中度侵蚀）向低等级（Ⅰ级微度侵蚀）和高等级侵蚀（Ⅴ级极强度和Ⅵ级剧烈侵蚀）的2个极端演化的趋势。鄱阳湖流域土壤侵蚀量从1990年到2000年增长幅度达6.3%；土壤平均侵蚀模数都约为1 100 t/(km2·a)，属于Ⅱ级轻度侵蚀。分析2个年份的土地利用/覆盖变化，发现鄱阳湖流域湿地和农田面积减少，建筑用地增加均是造成土壤侵蚀量增加的因素，而降雨侵蚀力因子空间格局也对土壤侵蚀空间分布具有重要影响，最后提出了鄱阳湖流域水土保持规划措施。

英文摘要:

The amount of soil erosion in Poyang Lake basin was estimated using the geomatics (RS and GIS) and the universal soil loss equation (USLE). The land use/cover map was derived from TM/ETM+ images of 1990 and 2000. Using digital elevation model (DEM), map of soil type and rainfall data, the special distribution of the factors in the USLE model were calculated, and the soil erosion maps of Poyang Lake basin were estimated respectively. The study showed that eroded areas in the Poyang Lake basin were mainly located in the upriver of Ganjiang River and Xinjiang River, middle reach and the upriver of Fuhe River and Xiushui River. According to the classification criterion of the soil erosion potential, most areas 97.38% and 97.30% of the basin suffered the very slight and slight erosion, while the slight and moderate erosion contributed most of the sediment yield, which amounted to 58.16% and 51.20% of the eroded soil in 1990 and 2000 respectively. And severe, very severe and extremely severe erosion in the basin should not be neglected. The soil erosion potential changed from slight and moderate erosion to very slight erosion, very severe and extremely severe erosion, which showed evolvement tendency from middle classification to lower and higher classification. The growth rate of eroded soil from 1990 to 2000 was 6.23%. The average soil erosion modules were both approximately 1 100 t/(km2 • a), which were classified to slight erosion. Analyzing the land use/cover change, areas of wetland and paddy shrank while areas for building increased, which led to larger amount of soil erosion in 2000. What was more, the distribution of rainfall was a considerable factor to affect soil erosion pattern. Finally, some planning measures of water and soil conservation were proposed.

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