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土地利用类型及其社会经济特征对河流水质的影响

Impacts of land use and socioeconomic activity on river water quality

关键词：小流域 土地利用类型 社会经济 河流水质

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摘要：流域尺度上土地利用类型与水体水质之间存在相关关系,这种相关关系同时会受到各种社会经济活动的影响.在自然或半自然区域内,土地利用类型与水质的相关关系比较显著.然而,在城市区域内社会经济活动将会影响土地利用类型与水质的相关关系.为证实这一现象的存在,选取京津地区11个小流域为研究对象,分别从小流域综合分析和小流域聚类分析2个角度,分析土地利用类型及其社会经济特征与河流水质的关系,并以温榆河小流域情景分析进一步探讨社会经济因素对土地利用类型与河流水质关系的影响,结果显示,聚类分析中,半自然区域中小流域的TN、TP、NH_4^+-N均与土地利用类型相关,而城市区域中小流域的TN、TP、NH_4^+-N均与社会经济因素相关,社会经济因素的差异改变甚至削弱了土地利用类型与河流水质的相关性,验证了假设现象的存在.因此,在跨域城乡梯度的区域尺度研究水体水质及其影响因素的相关性时,需要综合考虑土地利用类型及其社会经济特征.

Abstract: Water quality is influenced by land uses in a watershed; however, it is not clear how the relationship further be modified by socioeconomic activities on the land uses. We assumed that land use types are significantly correlated with water quality in natural and semi-natural areas, while the intensified socioeconomic activities in urban areas change the relationship remarkably. To verify this hypothesis, we selected 11 small catchments in Beijing and Tianjin region to analyze the relationship between river water quality and land use types and its socioeconomic characteristics using small catchments comprehensive analysis and small catchments cluster analysis separately, and the impact of socioeconomic factors on the relationship through scenario analysis in the Wenyu River watershed. The small catchments cluster analysis showed that TN, TP, and NH_4^+-N were correlated with land use types in semi-natural areas, but they were correlated with socioeconomic characteristics in urban region, meaning that the diversity of socioeconomic factors changed or even weakened the correlation between land use and river water quality, which supported our hypothesis. We concluded that land use and socioeconomic factors should be considered synthetically when studying the relationship between water quality and its driving forces in a watershed at a regional scale.

Key words: small catchments land use types socioeconomic activity water quality

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