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基于元胞自动机的城市生态安全格局模拟——以东莞市为例

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Simulation of urban ecological security pattern based on cellular automata: A case of Dongguan City, Guangdong Province of South China.

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摘要

以城市化快速发展的东莞市为研究对象,选取景观生态安全程度为评价标准,获取生态安全的元胞1 km×1 km范围内的城市化元胞数,将其嵌入元胞自动机(CA)转换规则中作为约束条件,控制城市发展,建立生态安全的城市CA,模拟生态安全的城市发展形态.结果表明: 东莞市综合景观生态安全指数从1988年的0.497降低到2005年的0.395,景观尺度上的生态安全下降.利用生态安全的CA模拟的2005年东莞市生态安全指数由实际的0.395增加到0.479,模拟的城市景观生态压力减小、生态安全状态和综合景观生态安全程度提高.CA可以作为探索生态安全城市研究的有效工具.

关键词: 景观生态安全 元胞自动机 城市发展 东莞市

Abstract:

Taking the Dongguan City with rapid urbanization as a case, and selecting landscape *ecological* security level as evaluation criterion, the urbanization cellular number of 1 km×1 km *ecological* security cells was obtained, and imbedded into the transition rules of cellular automata (CA) as the restraint term to control urban development, establish ecological security urban CA, and simulate ecological security urban development pattern. The results showed the integrated landscape ecological security index of the City decreased from 0.497 in 1998 to 0.395 in 2005, indicating that the ecological security at landscape scale was decreased. The CA- simulated integrated *ecological* security index of the City in 2005 was increased from the measured 0.395 to 0.479, showing that the simulated urban landscape ecological pressure from human became lesser, ecological security became better, and integrated landscape ecological *security* became higher. CA could be used as an effective tool in researching urban ecological security.

Key words: landscape ecological security cellular automata urban development Dongguan City.

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