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基于CA-Markov的哈尔滨市土地利用变化及预测

Dynamic change and prediction of land use in Harbin city based on CA-Markov model

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中文摘要:

为探讨哈尔滨城市化进程中土地利用时空演变规律以及驱动机制。该文以1989年、2001年和2007年Landsat TM影像为数据源,借助于地学信息谱图理论,运用RS和GIS技术分析研究区域18 a土地利用格局变化,以2007年土地利用格局为基础,利用CA-Markov模型并引入终极状态概率,预测2025年土地利用情况和平衡状态下土地利用空间分布格局。研究表明:区域土地利用格局以耕地为主,其面积比例均超过60%,其次是林地和居民工矿用地;稳定型图谱空间分布广泛,占研究区域总面积比例最大,"耕地→耕地→耕地"是其面积最大的变化图谱,"林地→林地→林地"次之,持续变化型所占比例最小,"未利用地→林地→耕地"是其面积最大的变化图谱;CA-Markov模型预测结果表明从2025年到土地利用终极状态期间,耕地面积持续减少,居民工矿用地持续增加,耕地→居民工矿用地是其主要转化轨迹,其他地类变化量相对较小,基本上处于动态平衡状态中,该行为土地利用合理规划、生态恢复和区域经济发展提供依据。

英文摘要:

To explore the spatio-temporal evolution law of land use and driving mechanism in urbanization of Harbin city, based on the data of Landsat TM images in 1989, 2001 and 2007 and Geo-Information TUPU theory, the distribution land use pattern in past 18 years was analyzed by RS and GIS. At the same time, based on the land use pattern in 2007, by using CA-Markov model, the land use patterns and the spatial pattern distribution of the equilibrium state in 2025 were forecasted. The results showed: the land use pattern was mainly dominated by cropland, area proportion of which exceeded 60%, followed by the forestland and the resident land; the spatial distribution of stable type atlas was wide-ranging and its area proportion was the greatest, the "cropland → cropland → cropland" was the greatest area change model, second model was "forestland → forestland → forestland", and the least proportion area was the stable change type, meanwhile, the greatest area change model was "unused land → cropland → forestland"; the simulation result by the CA-Markov indicated that the cropland would continue to reduce from 2025 to the ultimate states, while resident land would keep increasing, and the cropland → resident land was mainly change trace; other land uses kept dynamic balance statues for their relatively small variation capacity. The research results provide a scientific basis for land planning and management and regional economy developing.

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