

研究论文

# 西南岩溶区广西生态安全及资源利用效率

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**摘要** 构建了基于生态足迹理论的生态安全综合评价模型, 然后基于生态安全评价指标, 把数据驱动下动态计量经济学的单位根检验和与协整分析模型引进到生态安全与资源利用效率之间的动态均衡关系的研究中来。

以西南岩溶区广西为例, 首先采用生态足迹理论方法来测算1990~2003年广西生态安全的生态足迹、生态承载力、生态盈亏及生态压力指数, 然后采用动态计量的协整分析方法对广西区域资源利用效率与生态安全状况诸指标之间的长期关系进行了协整分析。结果显示, 广西生态足迹呈不断增加趋势, 生态承载力呈不断下降趋势, 出现了严重的生态赤字, 生态足迹压力增幅明显, 从临界安全状态发展到不安全状态; 资源利用效率不高与生态安全指标之间呈现一种长期稳定的趋势, 这表明岩溶区广西的资源利用效率不高, 生态安全形势不容乐观, 需要及时采取应对策略与措施加以调控。

**关键词** [区域生态安全; 资源利用效率; 生态足迹; 协整分析; 动态均衡关系](#)

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## Ecological security and resource utilization efficiency of Guangxi Province in Southwest Karst Areas of China

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**Abstract** The Ecological Footprint (EF) has received considerable attention as a useful indicator in the context of sustainable development. So far, it has mostly been applied as a static indicator. Ecological Footprint analysis method is an important means used to measure regional ecological security by integrating them with other econometric methods. Here, we have developed a set of long-term EF time series indicators to analyze the dynamic equilibrium relationship between regional ecological security and resource utilization efficiency based on the theory and methods of ecological footprint, Augment Dickey and Fuller (ADF) Unit root test and Cointegration analysis of dynamic econometrics. Combining with the change of regional land use, resource environment, population, social and economic development, taking Guangxi Province in Southwest Karst Areas of China as an example, calculates measurement index of ecological footprint, ecological carrying capacity, ecological surplus/loss and ecological pressure for the period 1990-2003 of Guangxi Province. This paper puts forward the concept of ecological pressure index, and constructs ecological pressure index models, ecological security grading systems and the analytical models of different ecological footprints. What is more, ecological carrying capacity, ecological surplus and ecological security change are also measured. The authors also test and assess the ecological footprint demand of 10000 yuan of GDP (resource utilization efficiency). Based on index of ecological footprint, ecological carrying capacity and ecological surplus/loss, this paper uses Elliott-Rothenberg-Stock unit root test and Johanson Cointegration test methods of dynamic econometrics to analyze the trending relationship between low efficiency of resource utilization and ecological security index. The results show that: (1) The ecological footprint has quickly increased from 0.6017 hm<sup>2</sup> to 1.1378 hm<sup>2</sup>, which shows an ascending trend with varying degrees; (2) Th

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e ecological carrying capacity, has decreased from 0.8204 hm<sup>2</sup> to 0.6537 hm<sup>2</sup>, which shows a degressive tendency; (3) The ecological surplus has increased from 0.2188 hm<sup>2</sup> to 0.4841 hm<sup>2</sup>, which shows a decreasing tendency and has serious ecological deficit; (4) The ecological pressure index over the period of 1990-2003 has quickly increased from 0.7334 to 1.7406, and the ecological pressure has developed from critical secure state to not secure state which shows the growth extent is huge; (5) The trending relationship between low efficiency of resource utilization and ecological security index has a long-run and stationary tendency, which an optimistic development trend would not last as time goes by; (6) The authors think that the relationship between resource utilization efficiency and ecological security and its dynamic development cointegration trend should be taken into account as soon as possible when the government constitutes its ecological and economic policies, and a countermeasure should be taken to adjust the stringent situation in time; (7) These integrating methods have a good foreground application in the future.

**Key words** regional ecological security; resource utilization efficiency; ecological footprint; cointegration; dynamic equilibrium relationship

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