

Evolution pattern and driving mechanism of eco-environment quality in China's ecological civilization pilot zones

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摘要: An essential requirement for the sustainable development of civilization and nature is the maintenance of a balance between environmental preservation and human progress. Therefore, the Chinese government hopes to assuage the dilemma between economic development and eco-environment preservation through the scientifically-driven construction of ecological civilizations, thus promoting the decoupling of eco-environment decline and economic growth. Jiangxi Province is one of the first ecological civilization pilot zones (ECPZ) in China. The assessment of eco-environment quality (EQ) assessment and its future trends are of great significance to the maintenance of ecological security in Jiangxi Province and the construction of other pilot zones in China. The aim of this study is present a more robust index to measure regional EQ, explore interactions among factors that drive EQ, and elucidate the future trends of EQ. First, an extended remote sensing ecological index (ERSEI) is proposed to improve the RSEI model by replacing NDVI with FVC and adding a difference index (DI) reflecting air pollution. Second, the spatiotemporal distribution features and change trends of ERSEI in Jiangxi Province are analyzed. Third, the optimal solution between the influencing factors is obtained through the two modules of single-factor and interaction detections of the OPGD model. Finally, the advantages and applicability of the ERSEI model, and future trends and prospects of applying ERSEI in Jiangxi Province are discussed. Our results show that: (1) Compared with the remote sensing ecological index (RSEI), the ERSEI can more effectively reflect regional differences in EQ. (2) Areas with an excellent ERSEI are mainly located in the important ecological barrier areas of Jiangxi Province, whereas areas with poor or worst ERSEI values correspond to the spatial distribution of the Nanchang metropolitan circle, town clusters, and urban development axes. (3) The ERSEI in Jiangxi Province improved in 72.50% of the study area from 2001 to 2021. (4) Slope, population density, and elevation are the key factors affecting the ERSEI, with the interaction between slope and population density explaining 79.9% of the variance in the ERSEI spatial distribution. (5) The areas predicted to see future rises and falls in the ERSEI in Jiangxi Province at 56.55×10^3 and 96.24×10^3 km², respectively. These research results can provide support for Jiangxi Province to achieve sustainable development and ecological civilization construction, while also providing an ERSEI that effectively identifies regional differences and acts as a new reference to further EQ research.

关键词: Eco-environment quality; Trend analysis; Optimal parameters-based geographical detector model; Future prediction