

Monitoring the Landscape Pattern Dynamics and Driving Forces in Dongting Lake Wetland in China Based on Landsat Images

Mengshen Guo¹, Nianqing Zhou¹, Yi Cai¹, Wengang Zhao², Shuaishuai Lu¹, and Kehao Liu¹

¹Tongji University

²Hunan Institute of Water Resources and Hydropower Research

March 08, 2024

Abstract

Dongting Lake wetland is a typical lake wetland in the Middle and Lower Yangtze River Plain in China. Due to the influence of natural and human activities, the landscape pattern has changed significantly. 12 Landsat images of Dongting Lake wetland from 1991 to 2022 were extracted and classified based on the CART decision tree method. The dynamic characteristics of wetland vegetation spatial pattern changes were analyzed using landscape pattern index, dynamic degree model and transition matrix model. Redundancy analysis and grey correlation analysis methods were used to explore the driving factors. The results showed that from 1991 to 2022, the area of water and mudflat showed a trend of first decreasing and then increasing due to the establishment of the Three Gorges Dam. The mutual conversion of mudflat and water was one of the forms of landscape transformation, while the mutual conversion of sedge and reed area was the main trend of vegetation landscape change. In the past 32 years, the fragmentation degree of Dongting Lake wetland landscape has increased, the heterogeneity has decreased and the landscape shape has become more complex. Water level had the greatest contribution to wetland landscape fragmentation, with the lower the water level, the greater the degree of landscape fragmentation. Human activities were the most important driving force, especially the policy changes in reed and woodland, as well as the establishment of the Three Gorges Dam, which have a significant impact on the landscape change pattern and ecological function of wetland. The research results are of great significance for wetland ecological restoration and environmental protection, providing scientific support for China to achieve the goals of “carbon peak” and “carbon neutrality”.

Hosted file

Ecology and Evolution - manuscript.docx available at <https://authorea.com/users/752218/articles/723093-monitoring-the-landscape-pattern-dynamics-and-driving-forces-in-dongting-lake-wetland-in-china-based-on-landsat-images>









