

## 双碳目标下中国省域林木碳减排承载力时空演进及其影响因素研究<sup>2</sup>

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**摘要:**【目的】将林木碳汇贡献纳入中国温室气体减排研究框架,能够更为公平地推进区域协同减排责任分担与协调。本文旨在测度林木碳减排承载力指数,并对其空间分异来源、动态演进趋势以及影响因素进行探究,为各省提供差异化减排建议,助力实现碳达峰、碳中和。【方法】利用 2001–2021 年中国大陆 30 个省份的林木碳汇与温室气体排放数据,运用 Dagum 基尼系数、Kernel 密度估计、空间计量模型,实证分析省域间林木碳减排承载力的区域差异及影响因素。【结果】①2001–2021 年中国整体林木碳减排承载力整体有所上升,整体演变为东北>西部>中部>东部的空间格局。②林木碳减排承载力空间分异特征整体较高,总体基尼系数由 2001 的 0.5021 下降波动性下降至 2021 年的 0.4789。区域间差异贡献率最高(均值 43.83%),其次是区域间超变密度(均值 30.45%),区域内差异贡献率最低(均值 25.72%),内部表现为东部>中部>西部>东北的特征;整体组间差异有所降低,东部与其他区域间差异显著,东北与西部间差异最小。③中国整体林木碳减排承载力有所提升且绝对差异有所下降,各区域动态演进特征差异较大,东部以及西部内部省份极化较为明显且整体趋于弱化,东北内部离散程度较小,区域内差异呈现先升后降的趋势。④中国省域林木碳减排承载力收到产业结构、经济发展水平、环境规制、绿色技术创新等因素的影响。【结论】中国林木碳减排承载力区域差异较大且动态演进特征差异明显。使用空间计量模型能够较好地识别全国及四大区域林木碳减排承载力的影响因素及其空间溢出效应,对于因地制宜采取差异化措施进行减排增汇具有重要意义。

**关键词:**“双碳”目标; 林木碳减排承载力; 区域差异; 影响因素

## Spatio-temporal Evolution of Carbon Emission Reduction Carrying Capacity of Forest in Chinese Provinces under Dual Carbon Targets and Its Influencing Factors

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**Abstract:** 【Objective】Incorporating the contribution of forest carbon sinks into the research framework of China's greenhouse gas emission reduction can more fairly promote the sharing and coordination of regional coordinated emission reduction responsibilities. The aim of this study was to measure the carbon emission reduction carrying capacity index of forest, and to investigate the sources of spatial differentiation, dynamic development trends and influencing factors, which can help to provide differentiated emission reduction proposals for each province, and help to achieve carbon peaking and carbon neutrality. 【Method】Using data on forest carbon sinks and greenhouse gas emissions from 30 provinces in mainland China from 2001 to 2021, Dagum's Gini coefficient,

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Kernel's density estimation and spatial econometric modelling were used to empirically analyse the regional differences in the carrying capacity of forest carbon emission reduction among provinces and the factors influencing it. **【Result】** From 2001 to 2021, China's overall forest carbon emission reduction carrying capacity increases and evolves into the spatial pattern of Northeast > West > Central > East. The overall spatial differentiation characteristic of the carrying capacity of forest carbon emission reduction was high, and the overall Gini coefficient decreased from 0.5021 in 2001 to 0.4789 in 2021. The inter-regional difference contributed the highest percentage (mean 43.83%), followed by the inter-regional hypervariable density (mean 30.45%), and the intra-regional difference contributes the lowest rate (mean 25.72%), and internally it shows that the East > Central > West > Northeast characteristics; Overall differences between the groups have decreased, with significant differences between the East and the other regions, and the smallest differences between the North East and the West. China's overall forest carbon emission reduction carrying capacity has increased and the absolute difference has decreased, the dynamic development characteristics of the regions are very different, the polarisation of the provinces in the east and west is more obvious and tends to weaken, the degree of dispersion within the northeast is smaller, and the intra-regional differences show a tendency of increasing and then decreasing. China's provincial forest carbon emission reduction carrying capacity receives the influence of industrial structure, economic development level, environmental regulation, green technology innovation and other factors. **【Conclusion】** The carrying capacity of forest carbon emission reduction in China varies greatly among regions, and the characteristics of its dynamic development are very different. The use of spatial econometric modelling can better identify the influencing factors and spatial spillover effects on the carrying capacity of forest carbon emission reduction in the country and the four regions, which is of great significance for the adoption of differentiated emission reduction and enhancement policies according to local conditions.

**Keywords:** "Double carbon target; carbon sequestration capacity of forest trees; regional differences; influencing factors.