



Study on the Spatial Distribution Characteristics and Influencing Factors of National Scenic Spots in China

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Abstract

With the help of ArcGIS analysis tools, this paper takes 244 national scenic spots in nine batches as the specific research objects, and uses the geographic concentration index research method to explore the spatial distribution status and influencing factors of scenic spots in China. The results show that: (1) National scenic spots are unevenly distributed across the country, and are generally clustered. There is one high-density area and six secondary high-density areas, and the number of scenic spots is more in the east and less in the west. (2) Scenic spots in different batches are unevenly distributed in space, showing a concentrated distribution state, and showing a trend of transformation from uniform type to agglomeration type. (3) Natural foundation, human factors, and economic development conditions are important factors affecting the spatial distribution characteristics and type structure differences of national scenic spots. The interaction of these factors affects the distribution status of scenic spots.

Subject Areas

Culture

Keywords

National Scenic Spots, Natural Factors, Economic Factors, Spatial Pattern

1. Introduction

The CPC Central Committee and the State Council are working hard to promote the construction of China's national park system, strengthen the protection of ecosystems, achieve sustainable use of resources, protect the natural ecological environment and historical relics of great significance, and rationally develop and

utilize natural and cultural resources. China's national scenic spots were formerly known as national key scenic spots and belong to the category of national natural parks. As China's attention to the construction of ecological civilization increases, in 2021, China announced the first batch of national parks, requiring the strengthening of the protection of flora, fauna, ecological environment and characteristic forest ecosystems in these areas [1]. The report of the 19th CPC National Congress proposed to "build a national land space development and protection system, improve the supporting policies for the main functional areas, and establish a natural protection area system with national parks as the main body" [2]. In recent years, domestic scholars have used Arc GIS and other technical means, combined with location theory, spatial structure theory, scale distribution theory, etc. to conduct analysis and research. Domestic scholars have studied the spatial structure of tourist attractions at the provincial, regional and national levels, and tried to use regional spatial structure theory to explain the formation mechanism and evolution pattern of tourism spatial structure [3]. It can be seen that studying the spatial distribution characteristics of national scenic spots is conducive to integrating resources and making reasonable plans for regional development; its tourism resource structure is very representative, and exploring its influencing factors is of great significance to the evaluation, maintenance, and rational utilization of scenic spot quality and the protection of the ecological environment.

2. Data Sources and Research Methods

2.1. Data Source

The relevant data on national scenic spots in this article are from the "China Urban and Rural Construction Statistical Yearbook" [4]; data on the economy, cultural and tourism industry investment, etc. of each province and city are from the "2021 Provincial Statistical Yearbook" and the Ministry of Culture and Tourism of the People's Republic of China; the maps involved in this article are all downloaded from the standard map service website of the National Administration of Surveying, Mapping and Geoinformation Services [5].

2.2. Research Methods

The nearest neighbor distance is a geographical indicator that indicates the degree of proximity of point-like objects in geographic space. Based on the distribution of resource monomers in the country, this paper abstracts 244 national scenic spots into point-like elements for spatial structure analysis. The distribution states of point-like elements in space can be divided into three types: uniform distribution, random distribution, and clustered distribution.

The expression formula is:

$$\mathbf{R} = \frac{R_t}{R_E}$$

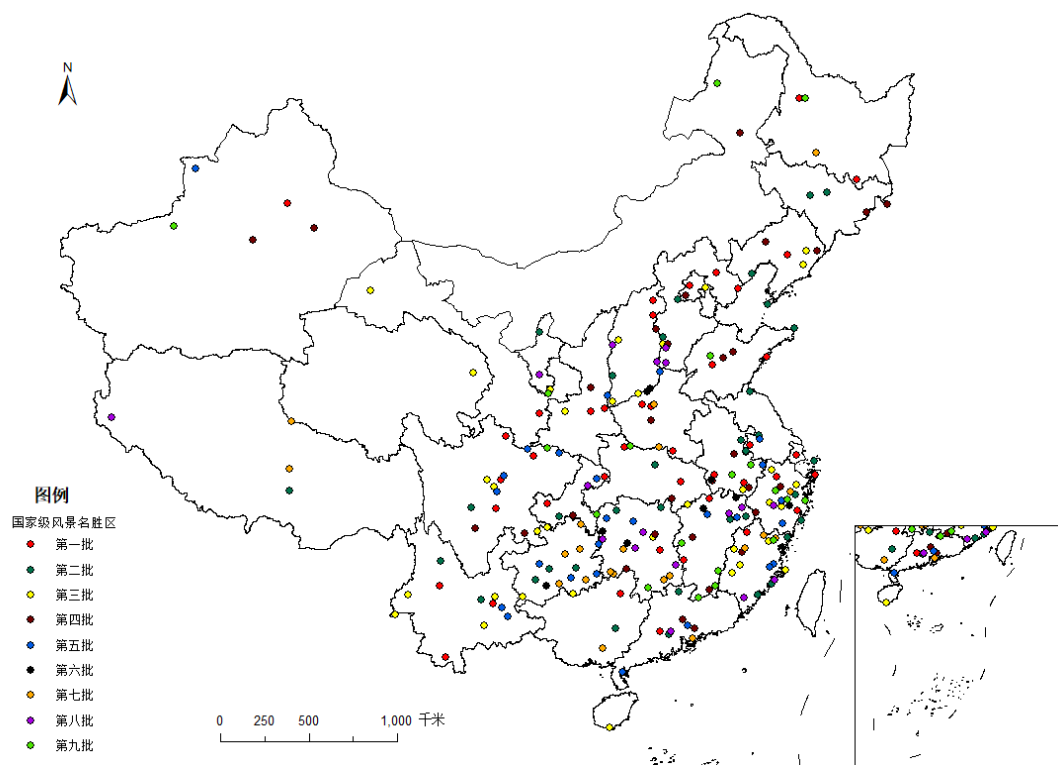
$$R_E = \frac{1}{2} \sqrt{\frac{S}{N}}$$

where: R is the nearest neighbor distance index, R_i is the actual distance, R_E is the theoretical distance, S is the area of the region, and N is the number of national scenic spots in the region. When $R = 1$, the national scenic spots are randomly distributed; when $R > 1$, the national scenic spots tend to be evenly distributed; when $R < 1$, the scenic spots are clustered.

3. Spatial Distribution Pattern of National Scenic Spots in China

3.1. Overall Spatial Distribution Characteristics

The nearest neighbor index of national scenic spots in China can be calculated by ArcGIS 10.6 software, $R = 0.630361 < 1$, indicating that national scenic spots are clustered in spatial distribution. The spatial distribution of national scenic spots in China is shown in **Figure 1**, which is as follows: From the perspective of geographical regional differences, the proportions of China's seven major geographical regions are 6.97%, 8.61%, 15.57%, 33.61%, 4.92%, 22.95%, and 7.37%, respectively. The East China region has the highest distribution ratio, while the South China region (mainly Guangdong, Guangxi, and Hainan, with no data for Hong Kong and Macao) has the lowest distribution ratio.

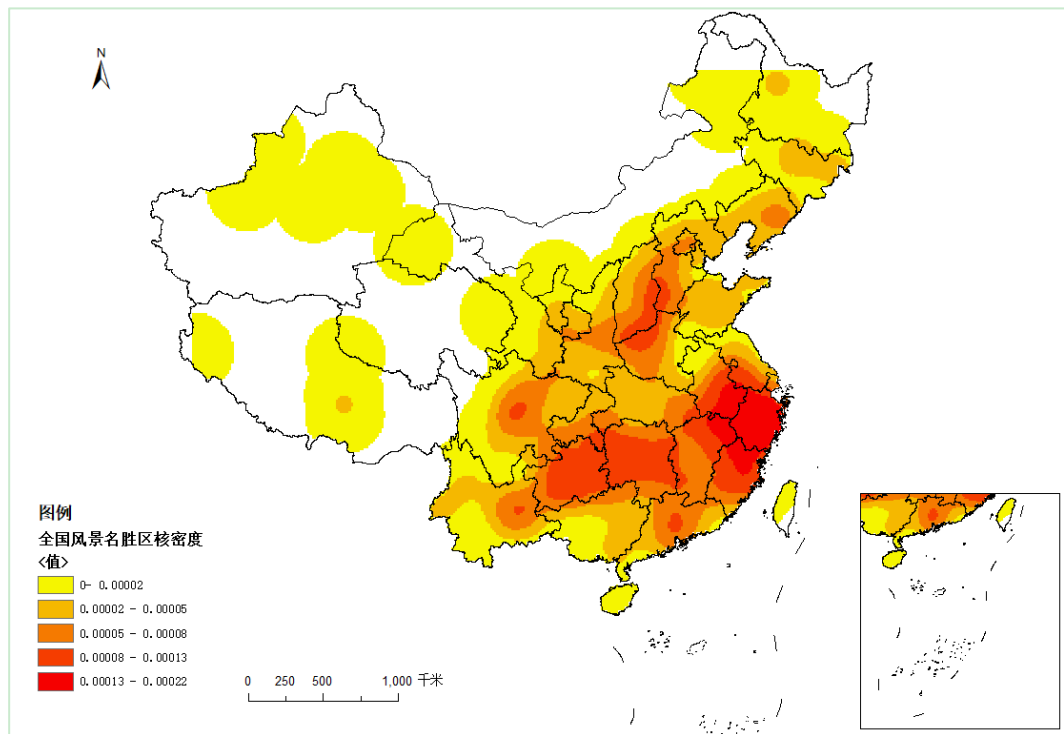


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Figure 1. Overall distribution of scenic spots in different batches.

The kernel density analysis of national scenic spots (**Figure 2**) shows that the distribution of national scenic spots presents 1 high-density area and 6 secondary

high-density areas. Zhejiang and its three provinces, Jiangsu, Anhui, Jiangxi and Fujian, form a density core, around which a secondary density core is formed; the junction of Guizhou, Hunan, Chongqing and Jiangxi provinces forms a secondary density core; Guangzhou, Kunming and Chengdu form secondary density cores respectively; the junction of Shanxi, Henan and Hebei provinces forms a secondary density core.



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Figure 2. Kernel density analysis of national scenic spots.

3.2. Regional Spatial Distribution Characteristics

Tourist attractions can be divided into natural landscapes (based on natural resources, such as Yunnan Stone Forest and Mount Everest), cultural landscapes (landscapes composed of various social environments, people's lives, historical culture, etc., such as White Horse Temple and Mogao Grottoes in Dunhuang), and both natural and cultural types (landscapes based on natural landscapes that are endowed with national spirit and culture, such as Mount Tai and West Lake) according to the type of resources.

Northeast China is an old industrial base in China. The nearest neighbor index of this region is $R = 0.863407 < 1$, indicating that its spatial distribution type in Northeast China is not very obvious. The agglomeration type (Table 1) shows that there are 17 tourist resource units in this region, including 15 natural types, 1 cultural type, and 1 dual-type scenic spot (memorial type—lake type). The provinces in the eastern region have superior geographical locations, and the coastal provinces have taken advantage of their favorable positions to form ports for China's

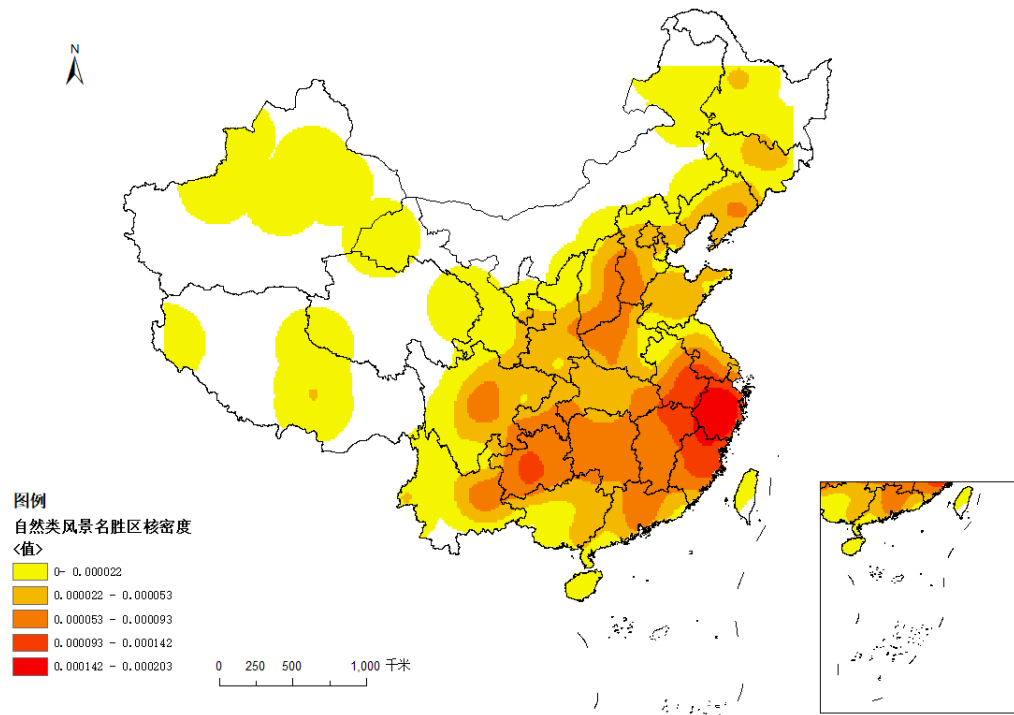
foreign trade. The R value of this region is slightly smaller than that of the Northeast China, and the degree of agglomeration is more obvious than that of the Northeast China. There are 74 scenic spots in this region, accounting for 30.33 % of the national scenic spots in China. The Yellow River Basin in the central region is the main birthplace of the Chinese nation [6], with a rich historical and cultural heritage. The degree of spatial distribution and agglomeration of scenic spots in this region is not much different from that in the Northeast China. There are 74 scenic spots in this region, and natural types account for 78.38% of the total number of resource units in this region. The western region has a rugged terrain, limited transportation and other conditions, and relatively poor accessibility. Therefore, the natural landscape is less affected by the outside world, and most of the landscape has been preserved in its original appearance. The spatial distribution type of scenic spots in this region is agglomerated, and the R value in this region is significantly different from that in the northeast region, and the degree of aggregation is more obvious than that in the northeast region. There are 79 scenic spots in the western region, accounting for 32.37% of the national scenic spots in the country.

Table 1. Results of nearest neighbor index analysis in different regions.

Area	Quantity	\bar{R}_i , Average Observation Distance (m)	R (Nearest Neighbor Index)	Distribution Status
Northeast	17	88042.3812	0.863407	Agglomeration
East	72	66195.7549	0.707378	Agglomeration
Central	76	70729.6266	0.82279	Agglomeration
West	79	132821.0753	0.701752	Agglomeration

3.3. Spatial Distribution Characteristics of Different Types of Scenic Spots

Natural scenic spots (Figure 3) form a medium-density area with Liaoyang and Benxi as the core in the northeast region, and three general density areas are formed in the border area between Liaoning and Jilin, the border area between Jilin City and Heilongjiang, and Heihe City. In the eastern region, a high-density area is formed at the border area between Zhejiang Province and Fujian Province (Xiandu National Scenic Area in western Zhejiang, Jiangle Mountain · Erbadu Scenic Area, Yandang Mountain Scenic Area, Zhejiang Tiantai Mountain Scenic Area, Wuyi Mountain Scenic Area, Taimu Mountain Scenic Area and other scenic spots are concentrated here); Nanping, Ningde, and Putian in Fujian Province form a secondary high-density area. In the central region, a secondary high-density area is formed at the border area between Jiangxi and Anhui Province, and two medium-density areas are formed at the border area between Henan and Shanxi, and Hunan. In the western region, a secondary high-density area is formed in Bijie, Guizhou and its surrounding areas, and two medium-density areas are formed in Sichuan and the border areas of Guizhou, Yunnan, Sichuan, and Chongqing.



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Figure 3. Kernel density analysis of natural scenic spots.

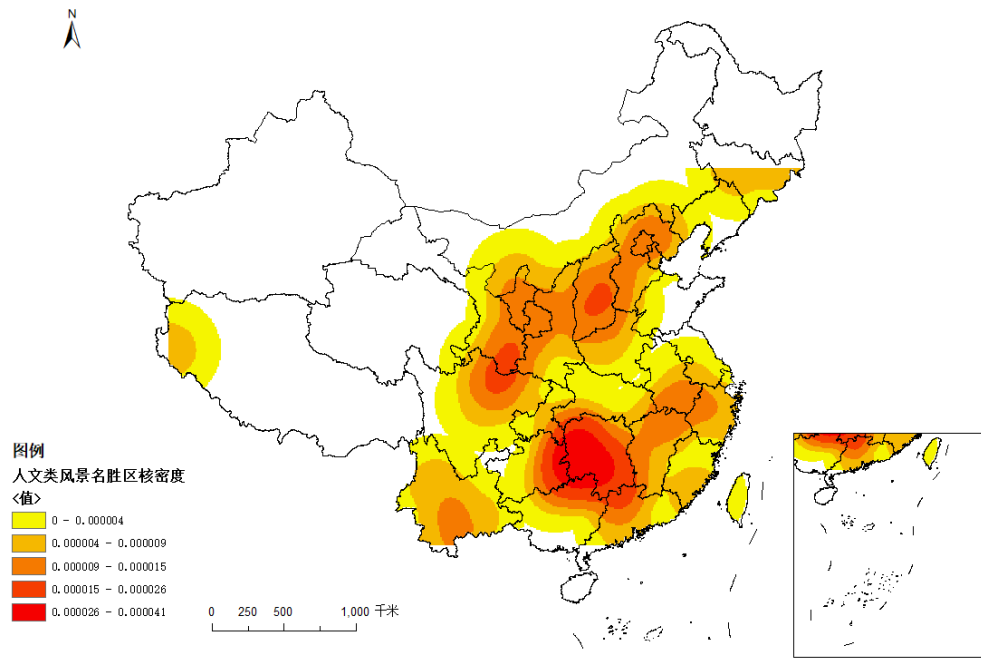
Cultural scenic spots (**Figure 4**) form a high-density area at the junction of Hunan, Guizhou and Guizhou (Yueyang Tower Junshan Island Scenic Area, Fenghuang Scenic Area, Zhuzhou Yandi Mausoleum Scenic Area, Liye-Wulongshan Scenic Area and other scenic spots with ethnic characteristics are concentrated); the Sichuan-Gansu border area, Changde, Zhangjiajie, Xiangtan, Zhuzhou and other places in Hunan, Jinzhong, Changzhi and Linfen in Shanxi form a secondary high-density area. The medium-density area centered on Beijing, Tianjin and Hebei; the eastern region of Fujian Longyan, Quanzhou, Putian, Zhangzhou; Zhejiang Huzhou, Jiaxing and other places and Beijing, Tianjin, Hebei and other peripheral areas form four general density areas.

4. Analysis of Influencing Factors

4.1. Natural Factors

My country has a vast territory and rich resources. Its terrain is high in the west and low in the east, forming a stepped distribution. The topography has a great influence on the distribution of scenic spots in my country [7]. Most of my country's scenic spots are distributed in the junction of the second and third steps. Mountainous scenic spots are mostly distributed in areas with undulating terrain, forming unique geological features. Water plays an important role in human production and life. It not only provides water sources, but also plays an important role in shipping, fisheries and hydropower generation. In the Yellow River Basin, national scenic spots are mainly concentrated around the Yellow River, Fen River

and Jing River; in the middle and lower reaches of the Yangtze River Basin, Qiantang River, Gan River, Min River and Han River. The interdependence of mountains and rivers has formed a unique resource advantage. Large rivers often span several provinces and cities. Due to different management systems in different regions, different regions have formed different resource characteristics.



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Figure 4. Kernel density analysis of cultural scenic spots.

4.2. Economic Factors

To a certain extent, gross domestic product reflects the overall economic level of a region, the rationality of its industrial structure, and the degree of improvement of its infrastructure. As of 2021, the cumulative GDP of Guangdong, Shandong, Zhejiang and other provinces in the past decade ranks among the top in the country. Provinces with a higher level of economic development have a larger number of scenic spots and better development conditions. The investment of each province and city in tourism directly reflects the importance the region attaches to the tourism industry. The amount of investment in culture and tourism by each province and city is generally increasing, and the growth rate is accelerating with the growth of economic development (**Figure 5**). Guangdong, Zhejiang, Jiangsu, Shanghai, Beijing and Shandong are the six provinces and cities that rank among the top in the country in terms of investment in tourism; tourism investment is not only used to maintain the quality of scenic spots, but also product innovation, marketing and services, and personnel training.

4.3. Human Factors

National scenic spots are representative of the country, have high quality require-

ments, and have a wide range of influence [8]. When constructing, accessibility is the primary consideration. Construction is based on natural landscapes. Adding service facilities can improve the quality of scenic spots. Different types of scenic spots have very different internal transportation conditions. For example, in mountainous scenic spots, the main transportation methods include cable cars, winding mountain roads, and glass plank roads, while river and lake scenic spots mainly use rafting and cruise ships. The transportation systems of urban scenic spots and memorial sites are the most developed. As the main body of tourism activities, people's behavioral characteristics have a great impact on scenic spots. Areas where humans live in large numbers have a strong transformation of the natural environment and give natural landscapes cultural significance. For example, Mount Tai Scenic Spot and Mount Heng Scenic Spot are places where emperors perform rituals and sacrifice.

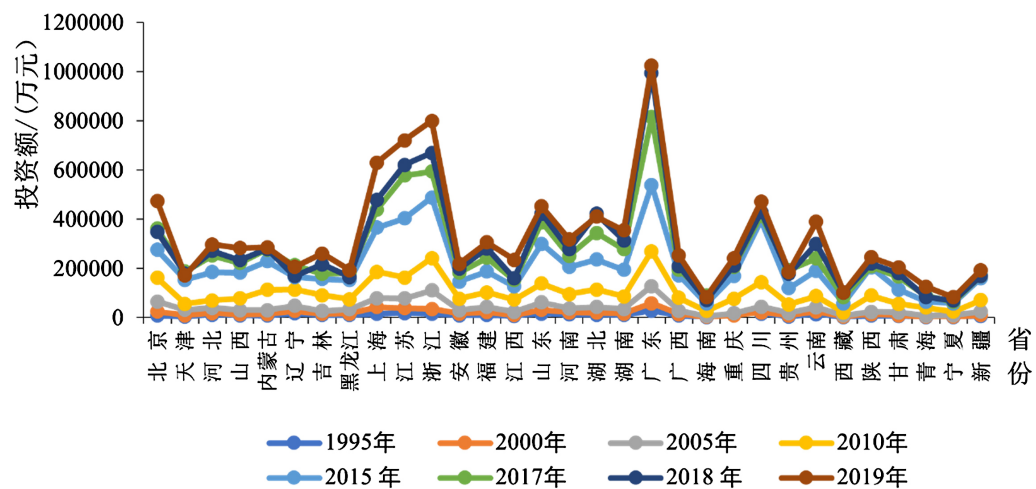


Figure 5. Analysis of tourism investment in various provinces and cities.

5. Conclusions

This paper takes national scenic spots as the specific research object, and uses ArcGIS software to analyze the spatial distribution characteristics of scenic spots across the country [9], obtains the overall spatial pattern of scenic spots in my country, the spatial pattern of scenic spots of different batches and types, and explores the factors that affect the spatial distribution characteristics of scenic spots. The main research conclusions are as follows:

(1) The spatial distribution of national scenic spots is generally characterized by being dense in the east and sparse in the west, more in the south and less in the north, and more in the southeast coastal area than in the northwest inland area. (2) Among the three major categories of national scenic spots (natural, cultural, and dual types), natural scenic spots account for the highest proportion, followed by cultural scenic spots; among the 14 medium categories, mountain scenic spots account for the highest proportion, mainly distributed in the eastern and central regions;

followed by rivers and lakes, which are more common in the western region, because the western region is the source of most rivers in my country. (3) The distribution of scenic spots of different batches and types shows obvious differences among regions, and the distribution of scenic spots in various provinces and cities also shows great differences. The resource reserves of each region are the basis for the development of scenic spots. Various factors interact with each other. Under the various interventions of humans, various resource monomers develop in a more optimized direction, forming the current distribution pattern of scenic spots.

China's national scenic spots show the characteristics of spatial distribution agglomeration, imbalance and agglomeration of spatial distribution. This result is conducive to the efficient use of various tourism resources and economic development factors by relevant departments in China, and can take measures according to local conditions, give play to regional advantages, create tourist attractions with unique characteristics, and avoid duplication. The spatial distribution of scenic spots is closely related to the resource conditions, economic foundation, and cultural heritage of each region. In the process of developing tourist attractions, we should give full play to the greatest resource advantages, deeply explore the cultural connotation, and achieve high-quality development of scenic spots.

Conflicts of Interest

The authors declare no conflicts of interest.

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