



Research on Online Attention to 5A-Level Tourist Attractions in Southwest China: A Perspective Based on Baidu Index

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Abstract. This study analyzes the spatiotemporal evolution of online attention for 39 5A-rated scenic spots in Southwest China from 2018 to 2024, using Baidu Index data and quantitative methods including the Seasonal and Geographical Concentration Indices. Results reveal a distinct "rise-decline-rebound-fallback" temporal pattern, with significant seasonal fluctuations that have moderated recently, indicating market rationalization. Spatially, attention has diffused from traditional hotspots to a more regional equilibrium, a trend more evident in natural scenic areas, with Guizhou and Chongqing showing notable growth. The findings demonstrate a structural shift from "hotspot concentration" to "regional equilibrium." Accordingly, policy recommendations for seasonal regulation, regional coordination, and smart governance are proposed to promote sustainable tourism development.

Keywords: Internet Attention, Geographical Concentration Index, Southwest China

1 Introduction

As search engines have become the primary channel for acquiring travel information, online attention has been validated as an effective leading indicator for assessing scenic area popularity and predicting tourist flow trends. [4] In the digital era, tourism decisions largely follow a "search-evaluate-act" pattern, making search data a critical real-time proxy for market dynamics [3]. Furthermore, online search behavior not only reflects travel preferences but also provides quantifiable psychosocial signals useful for detecting early structural shifts in regional tourism systems [7].

Southwest China, characterized by its rich natural and cultural resources, embodies a microcosm of China's evolving tourism spatial pattern. However, existing studies have lacked systematic spatiotemporal comparisons of online attention across this region over time. To address this gap, the present study introduces several methodological and empirical innovations. In addition to describing spatiotemporal evolution patterns, this study further explores the relationship between attraction type and changes in online attention concentration, thereby providing a more comprehensive

explanation of regional tourism dynamics. These include: analyzing longitudinal Baidu Index data (2018–2024) from 39 representative 5A-level scenic spots; incorporating the geographic concentration index (G-value) as a spatial metric; examining spatiotemporal evolution patterns of online attention; and revealing underlying mechanisms of regional tourism optimization—all aimed at supporting high-quality tourism development.

2 Research Data and Methods

2.1 Overall Spatial Evolution Trends

This study utilizes Baidu Index data from January 2018 to December 2024, covering 85% of Chinese search users with verified authority[3]. From the initial 50 designated 5A-rated scenic spots in Southwest China, 39 valid samples (26 natural and 13 cultural-historical) were confirmed after excluding 11 sites without Baidu Index records. Although the exclusion may slightly reduce sample coverage, the retained sample still accounts for 78% of all officially designated 5A attractions in Southwest China and therefore remains representative.

A Python-based system collected daily/monthly search indices and provincial-level attention data. The 2023-2024 data forms the core for geographic concentration index (G-value) analysis, using Southwest China's administrative map for spatial visualization. Rigorous data cleaning (outlier removal, missing value imputation, format standardization) ensured dataset reliability for subsequent analysis[4][5].

2.2 Research Methods

Geographic Concentration Index (G).

The geographical concentration of online attention was quantified using the Geographical Concentration Index (G), which is calculated as follows:

$$G = 100 \times \sqrt{\sum_{i=1}^n \left(\frac{X_i}{R} \right)^2} \quad (1)$$

X_i represents the number of online searches for the i -th province/region/municipality; R denotes the total number of online searches across all provinces/regions/municipalities nationwide; n is the total number of 34 provincial-level administrative units. This method has been widely applied in analyzing the spatial characteristics of tourism attention[1]. The larger G is, the more concentrated the geographic distribution of web searches becomes.

Spatial Visualization Analysis.

Utilizing the ArcGIS 10.8 platform, geographic coordinates of scenic areas were systematically integrated with corresponding search volume data to generate dynamic

spatiotemporal distribution heatmaps. Through the application of the natural break-point method (Jenks), the calculated G-values were classified into three distinct tiers - high, medium, and low - to objectively reflect inherent data patterns. This methodological approach effectively visualizes the spatial differentiation characteristics of attention levels across the study region, revealing clear core-periphery structures and emerging spatial clusters in the digital attention landscape.

3 Analysis of Spatio-Temporal Evolution Characteristics of Online Attention

3.1 Analysis of Spatial Evolution Characteristics

This study analyzes the spatial evolution of online attention for 39 5A-rated scenic spots in Southwest China through geographic coordinates and concentration indices (G-values). Selecting three representative years—2018 (pre-pandemic), 2021 (mid-pandemic), and 2024 (post-pandemic)—we integrate G-values with spatial heatmaps to systematically examine the "concentration-divergence-rebalancing" evolutionary process.

Before and After the Pandemic: From Centralization to Diversification.

The spatial distribution of G-values in 2018 and 2021 is illustrated in Figure 1. In 2018, a distinct "high-west, low-east" pattern was observed (see Fig. 1), with high-value areas ($G > 30$) concentrated in northwestern Yunnan and central Sichuan, forming clusters around Lijiang Ancient Town ($G = 20.39$) and Mount Emei ($G = 22.97$). Moderate values ($20 \leq G \leq 30$) were mainly found in the Sichuan Basin and parts of Yunnan, while low values ($G < 20$) dominated Guizhou and most of Chongqing.

By 2021, significant changes emerged: traditional hotspots showed weakened concentration, with slight G-value decreases in core areas like Lijiang ($G = 19.71$) and Mount Emei ($G = 22.75$). Meanwhile, Chongqing's heat intensity increased markedly, forming new high-value centers such as Pengshui Aiyihe ($G = 87.03$) and Simian Mountain ($G = 60.56$), indicating a shift toward multi-centered development driven by external disruptions to traditional tourism structures. This spatial restructuring reflects the adaptive and reconstructive capacity of regional tourism systems in response to external shocks, demonstrating how crisis-induced changes can accelerate the transformation of existing tourism spatial patterns^[5].

2024 Landscape: Moving Toward Holistic Balance.

The spatial distribution of G-values in 2024 revealed a clear trend toward regional equilibrium (see Fig. 2). Traditional hotspots had diminished, with high-value zones contracting to form localized clusters around core scenic areas. Emerging destinations such as Chishui Danxia in Guizhou ($G = 27.25$) and Simian Mountain in Chongqing ($G = 63.33$) maintained strong attention, establishing stable secondary hotspots. The spatial pattern has evolved from the 2018 "core-periphery" structure to a "multi-

centered, networked" configuration. High- and medium-value zones now interweave spatially, with significantly reduced regional disparities. Guizhou's transformation from uniformly low values to multiple medium-high value centers demonstrates improved regional tourism balance, consistent with nationwide attention diffusion trends.

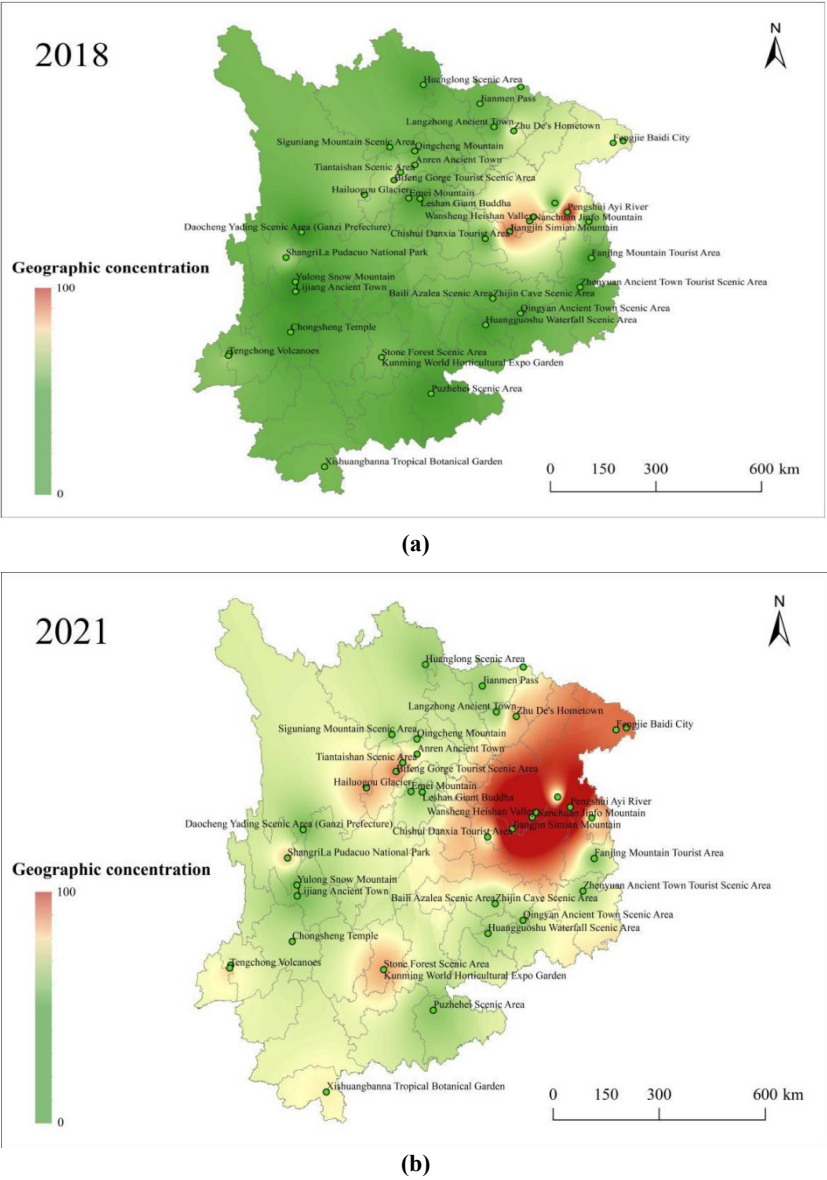


Fig. 1. Spatial Distribution of Geographic Concentration Index (G) for 5A Scenic Areas: (a) 2018; (b) 2021

presence. Subsequently, the 2019-2022 period witnessed a marked decline that closely corresponded with COVID- 19 travel restrictions, characterized by a sharp drop in 2020 followed by only partial recovery through 2021-2022, reflecting the persistent impacts ofthe pandemic on travel sentiment and mobility.

A rapid rebound to peak levels emerged during 2022-2023, driven by the synergistic effects of policy optimization and the release of pent-up consumer demand. The subsequent 2023-2024 period witnessed a notable stabilization of online attention, marking the tourism market's transition from initial "revenge travel" characteristics toward more sustainable and rational development. This shift in search behavior patterns indicates a maturation of both market supply and tourist consumption preferences, reflecting the sector's adaptation to post-pandemic conditions.

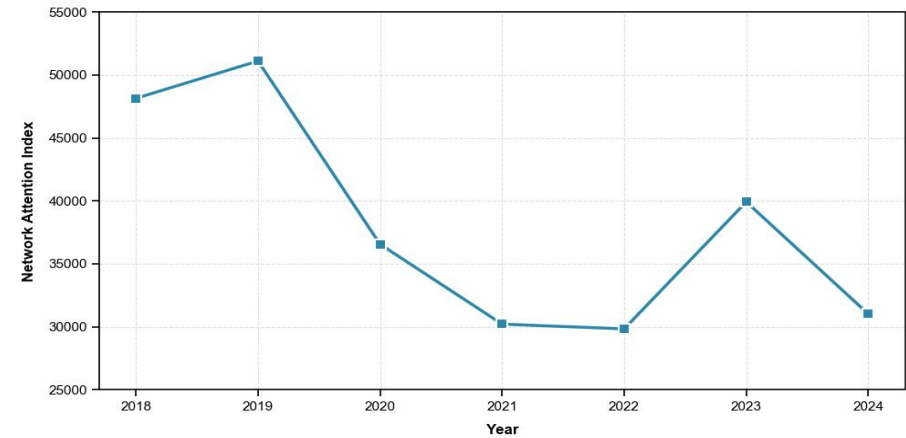


Fig. 3. Annual Trends in Online Search Volume for 5A Scenic Areas in Southwestern China (2018-2024)

Monthly Distribution Characteristics.

Monthly analysis of 2018-2024 online attention data reveals stable seasonal patterns in Southwest China's 5A scenic spots (see Fig. 4). Search volumes consistently peak from April to August, coinciding with optimal travel conditions, while declining significantly during winter months. The post-2020 period shows a sustained growth trajectory, with attention reaching record levels in 2023 before stabilizing in 2024. This stabilization reflects the tourism market's maturation and suggests a new equilibrium in visitor interest.

Short-term fluctuations are primarily driven by seasonal factors, while long-term trends reflect destination competitiveness and external environmental conditions. This pattern demonstrates the interaction between cyclical tourism demand and structural development factors, highlighting how immediate market responses coexist with evolutionary changes in tourism systems.

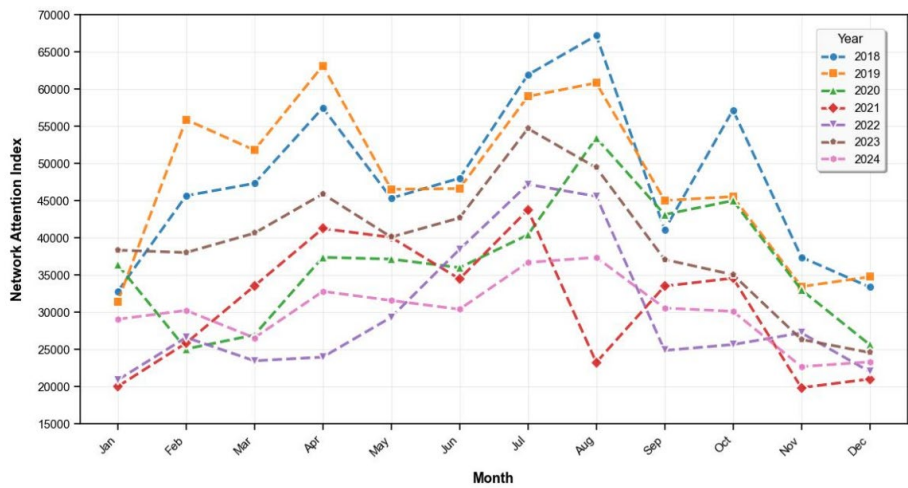


Fig. 4. Monthly Variations in Online Search Volume for 5A Scenic Areas in Southwestern China (2018-2024)

4 Conclusions and Recommendations

4.1 Research Findings

This study examines the spatiotemporal evolution of online attention for 5A-rated scenic spots in Southwest China (2018-2024). The findings reveal moderated seasonal fluctuations, indicating market rationalization, and a spatial diffusion from traditional hotspots toward regional equilibrium. This shift is particularly evident in natural scenic areas and emerging destinations like Guizhou and Chongqing. These patterns demonstrate a structural transformation in the region's tourism landscape.

Table 1. Correlation between Attraction Type and Change in Geographical Concentration

Variable	Mean ± SD	1	2
1. Attraction Typea	—	1	
2. G-value Change (ΔG)	-2.44 ± 13.27	.34*	1

Note: N = 39. aAttraction type is a dummy variable (Natural=1, Cultural=0).
p < .05

To delve into the driving mechanisms behind these spatiotemporal patterns, we employed a data mining approach. We calculated the change in G-value (ΔG) for each attraction from 2018 to 2024 and performed a Pearson correlation analysis with the

attraction's typology (encoded as a binary variable: Natural=1, Cultural=0). The results, summarized in Table 1, reveal a statistically significant positive correlation ($r^* = .34$, $p^* < .05$), providing quantitative, data-driven evidence that attraction type is a key factor in its evolution.

The negative mean ΔG confirms the overall trend of attention diffusion. The positive correlation signifies that cultural attractions experienced a more pronounced decrease in geographical concentration (more negative ΔG) compared to natural attractions. This finding supports the hypothesis that in the post-pandemic era, tourist attention has decentralized away from traditional, often culturally-oriented hotspots at a faster rate.

However, using Baidu Index as a proxy for actual tourist flows has limitations: online attention may be interfered with by media events, public opinions, or Baidu's algorithm adjustments, which may cause deviations from real tourist arrivals.

4.2 Recommendation

Based on the research findings, the following recommendations are proposed: (1) Implement measurable seasonal flow regulation: set visitor caps in peak seasons and launch themed products in off-seasons to reduce seasonal fluctuation.; (2) Launch interprovincial tourism pilot routes among Sichuan, Chongqing, Guizhou, and Yunnan to balance spatial distribution.; (3) Increase targeted new media marketing for emerging destinations in Guizhou and Chongqing with clear resource allocation.; (4) Build a smart monitoring system based on real-time Baidu Index to support data-driven decision-making for local tourism authorities.

Acknowledgements

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