

Spatial Distribution of Chinese Traditional Villages and its Influencing Factors

EGU General Assembly 2020

https://doi.org/10.5194/egusphere-egu2020-5479

EGU General Assembly 2020



GM12.1 Essential variables influencing geodiversity: contributions to geoheritage in response to global change

Yunong Wu^{1,2}, Bin Zhang^{1,2*}, Duo Xie^{1,2}, Yong Zeng^{1,3}, Wenjie Xu^{1,2}, Yulian Pan^{1,2}, and Guoliang Liu^{1,2}
 1Landscape Architecture Department, College of Horticulture and Forestry Sciences, Huazhong Agricultural University, Wuhan, China (yunong@webmail.hzau.edu.cn; abliviate@163.com; wenjixu@163.com; 313894208@qq.com)
 2Key Laboratory of Urban Agriculture in Central China, Ministry of Agriculture and Rural Affairs, Wuhan, China (lgihzau@163.com)
 3College of Plant Science, Tarim University, Alaer Xinjiang, China (zengy459@163.com)
 *Corresponding Author: zhangbin@mail.hzau.edu.cn



1 Introduction

Traditional village (TV), also known as 'ancient villages', formed early, have rich traditional resources, certain historical, cultural, scientific, artistic, social, and economic values, and still have relatively well-preserved village style and features, architectural structures, and unique folk customs, which should be protected. According to the evaluation on the TV Protection and Development by Committee of Experts, a total of 6,819 TVs from the five groups up to June 2019 in China. In this study, five groups of TVs in China were taken as the research objects, and ArcGIS spatial analysis tool was used to understand the distribution characteristics of TVs. All those to further enhanced the TVs distribution characteristics and the interpretation of determination factors, and solve the excessively holistic analysis of TV environment factors in traditional way, which conducive to the differences and collaborative of TV pleamangement and protection.

2 Method

2.1 The spatial autocorrelation analysis in spatial analysis module of ArcGIS was used to analyze the spatial distribution of TV. Moran's I statistics. This tool calculated local Moran's I value, Z score, pseudo P value, and the encoding of clustering types representing each element with statistical significance. Z score and pseudo P value represents the statistical significance of calculated index value.

2.2 Natural and human data set construction. Natural factors: Annual average temperature, humidity index, evaluation, relief amplitude, and distance to four-level river. Human factors: Cultural relics and historic sites, population, distance from TV to county, and distance from TV to main road.

2.3 Anselin Local Moran's I in the Arcgis spatial statistics module was used to analyze the distribution of 9 factors at TV sample points, which can identify high-value density, low-value density, and spatial outliers (High values are surrounded by low values or low values are surrounded by high values).

3 Results

3.1 The spatial distribution density of TVs in China showed significant differentiation (see Fig.1). The density is 7.08/10000 km², among which Zhejiang has the highest distribution density with 62.48/10000 km². Guizhou, Fujian, Shanxi, Hunan have the density of more than 30/10000 km², while Inner Mongolia, Heilongjiang, Xizang, Xinjiang have the distribution density of less than 0.5/10000 km².

3.2 Global autocorrelation The global Moran's I index of the spatial distribution of TVs in China is 0.352446, and the Z value of normal statistic is 949.77 (see Fig.2). Moran's I index is positive, and has passed the test of significance (Z value is greater than 0.01 and the critical value of confidence level is 2.58), which indicated that the spatial distribution of TVs in China has significant spatial autocorrelation.

3.3 Anselin Local Moran's I (see Fig.3)

3.3.1 Natural influence. The results show that the annual average temperature has less spatial outliers and more high clustering types mainly distributed in southeast China and southern Yunnan. The humidity index of TVs has relatively more spatial outliers compared with that of annual average temperature. There were many TVs points in southeast China except the main distribution of high-high clustering types. The relationship between TVs and altitude almost shows the normal distribution pattern, but the density of villages with low altitude was significantly higher than that with high altitude. There are many spatial outliers of relief amplitude, especially the low-high outliers, which show an extremely similar distribution to the high-high clustering type, and mainly show the concentrated distribution in the hilly landform areas of China. The geographical factors of TVs in Guizhou, Chongqing and Hunan have strong common characteristics in clustering type and outliers.

3.3.2 Human factors. The TV population clustering type and outliers are not significant. The high-high clustering type of TVs from cultural relics and historic sites were mainly concentrated in a few provinces in western China, while the low-low clustering type were mainly found in coastal areas. There were many low-low clustering types of distance from TVs to the main roads, which were mainly distributed in the regions with high density of economic development network in southeast China. For the distance from the TVs to the county, the high-high clustering type and low-high outliers were mainly distributed in the western region of China, while the low-low clustering type and high-low outliers were mainly distributed in a few provinces in eastern and central China. Cultural relics and historic sites, as a diachronic factor, also have a strong and significant impact on TVs, which often intensively appears near the city and shows a staggered state.

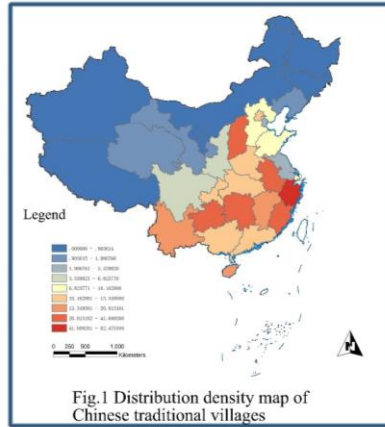


Fig.1 Distribution density map of Chinese traditional villages

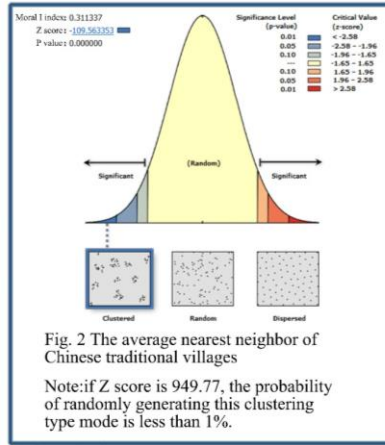


Fig. 2 The average nearest neighbor of Chinese traditional villages

Note: if Z score is 949.77, the probability of randomly generating this clustering type mode is less than 1%.

4 Conclusion

The TV distribution has the environmental selectivity and tendency, which can provide certain reference for the further identification of TVs. The diversified, targeted and cross-regional joint management and protection should be carried out in the future research, policy and planning process, rather than carry out too macroscopic protection, resulting in the negligence of regional characteristics or limited by the separating protection of administrative boundary.

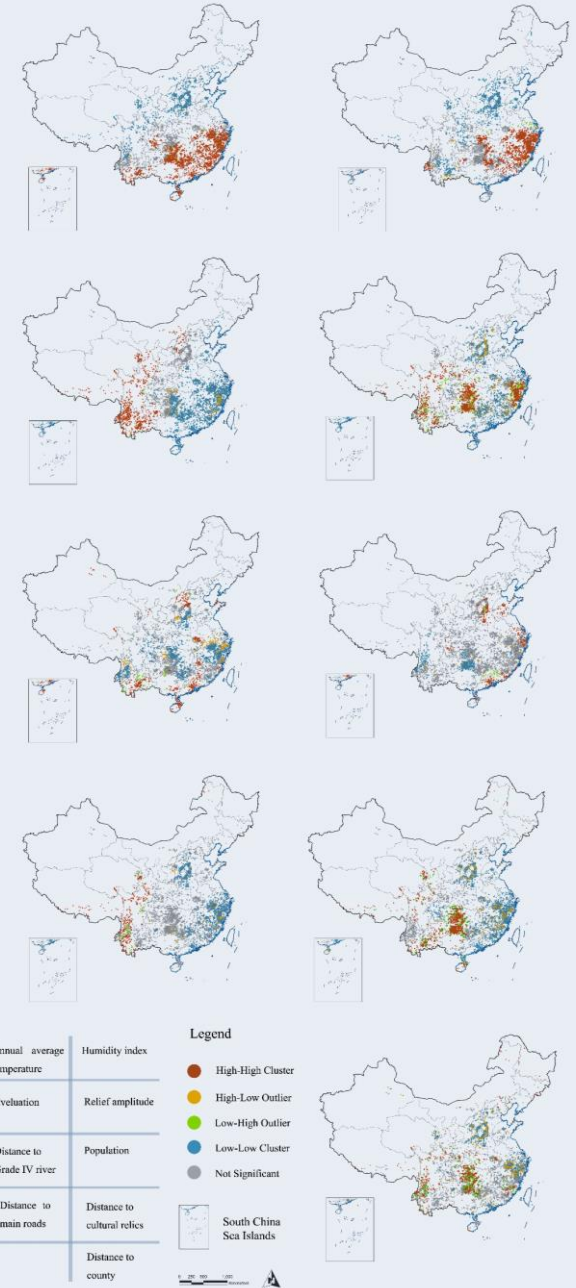


Fig.3 Analytical diagrams of Anselin Local Moran's I