



Differentiation of spatial morphology of rural settlements from an ethnic cultural perspective on the Northeast Tibetan Plateau, China



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ABSTRACT

Rural settlements are carriers of ethnic culture, and their spatial morphology is restricted by the natural environment and ethnic culture, especially in areas where ethnic consciousness is strong. In this study, we selected multi-ethnic communities in northwest China to analyze spatial morphology of rural settlements, and we described the relationship between ethnic culture and spatial morphology from the perspective of different ethnicities, leading industries, religious beliefs, and modern education. There were obvious geographical clustering characteristics and gradient variations in morphological structure of rural settlements in Qinghai Province, China. Spatial morphology of rural settlements in different multi-ethnic communities highlighted the ethnic characteristics of this unique nation, and it had an obvious relationship with their leading industries, modern education, and religious beliefs. The relationship between the spatial morphology of rural settlements and the leading economic activity revealed regular change in characteristics, from farming towns (F) to farming and animal husbandry towns (F-AH) to animal husbandry and farming towns (AH-F), and finally to animal husbandry towns (AH). The spatial morphology of other industrial towns (OI) did not show the coordinated regulation as did the other four categories, which showed the particularity of spatial morphology. All ethnic rural settlements had a significantly higher dependence on primary education than on religious beliefs. We concluded that educational resources will become an important factor in the future for optimizing the spatial pattern of rural settlements of multi-ethnic settlements in Northwest China.

1. Introduction

Rural settlements are the places where rural residents live and engage in agricultural production, which is the main morphology of human habitation formed by the interaction of local residents with the natural, economic, social, and cultural environments (Yang, Liu, Long, Qiao, & Yang, 2015). The formation and evolution of landscape morphological characteristics of rural settlements are not only influenced by natural factors, economic factors, and policy, but also by various factors such as ideology, ethics, religious beliefs, agricultural production, and cultural customs (Gude, Hansen, Rasker, & Maxwell, 2006; Polat & Olgun, 2004; Sanjay, 2007; Shmueli, 1980). Because they are the main carrier of ethnic culture (i.e., religion, beliefs, customs and traditions, languages, food, arts, and values), the itemized function of rural settlements has been integrated into the culture of their ethnicity and is reflected in the spatial morphological characteristics of rural

settlements (Segun, 2012). However, there are still few studies on the spatial morphological structure of rural settlements from the perspective of cultural differences in multi-ethnic communities.

Ethnic groups are communities with a common cultural background that live in a specific geographical environment with unique production systems, religious beliefs, and cultural education. After a long history, the production and life processes developed gradually to form cultures with ethnic characteristics, which are the “genetic code” that differentiates ethnic groups (Wu, 2012; Yang, 2014). Early geographers attempted to simply link the morphological structure of the settlements in different countries in Europe with the distribution of ethnic groups (Cheyney, 1897). However, some scholars believe that the link between ethnic groups and their settlements is obscure and that this link cannot be attributed to the historical trajectory based on simple national logic (Sorre, 1952; Toffin & Champs, 1994). In multi-ethnic communities, the natural environment determines the “regional” aspect of the

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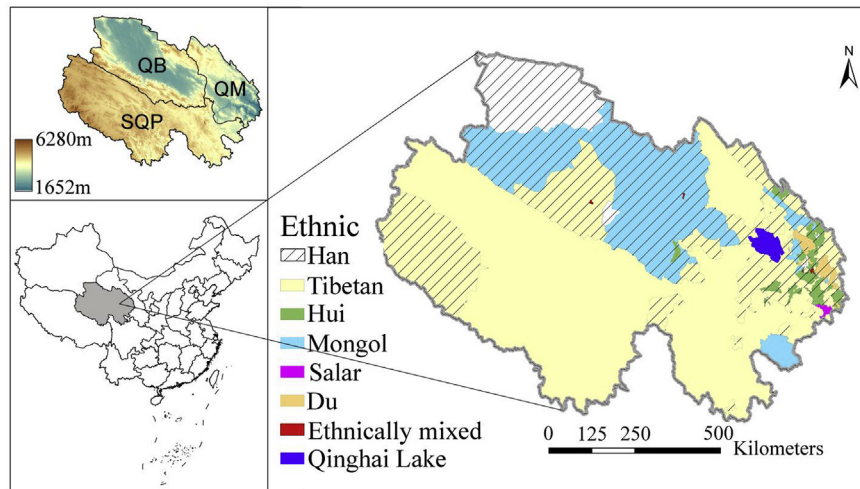


Fig. 1. The study area and spatial distribution pattern of different ethnic groups over Tibetan Plateau, China.

settlements; however, their ethnic culture is the concentrated expression of the “ethnic character” of the settlements. Hence, ethnic cultural characteristics inherent in ethnic groups should be considered in addition to the focus on “regional” characteristics when studying rural settlements of multi-ethnic communities (Wu, 2012).

Ethnic distribution, industrial space, and religious space are key factors that control the spatial characteristics of rural settlements in multi-ethnic areas, and cultural education is the driving factor that promotes the evolution of spatial characteristics of rural settlements (Yang, 2014). Even in the same geographical space or under the same natural environmental conditions, different ethnic groups inherit different traditional cultures, which include their mode of economic activity and religious beliefs. This inheritance determines the cultural psychology and cultural traditions of homoplasmy among a group of people, which is transmitted directly through the morphological characteristics of rural settlements (Guan, 2001; Wu, 1992). The pursuit of modern education results from urbanization, and then the uneven supply of basic education in urban compared to rural areas, the imbalance of resource allocation, and other issues emerge gradually (Tang, Xiang, Luo, & Chen, 2017). Many scholars have applied space accessibility technology to understand the dependence of rural settlements on educational facilities (Chin & Foong, 2006; Singleton, Longley, Allen, & O'Brien, 2011). However, due to the limitation of multi-source data, there has been little research on the complex ethnic environmental backgrounds of multi-ethnic settlements, and quantitative research with large scale spatial data is still insufficient.

There are 56 ethnic groups in China. The basic pattern of ethnic geographical distribution reveals that the Han are the major component of the “big mixed, small settlements” that have an interlaced distribution on the national scale. Northwest China is noteworthy for its concentration of ethnic minorities that live in compact communities. Since 2000, the Chinese government has implemented the “western development” policy in the vast land in western China, and the rural economy has developed rapidly. The settled ethnic residents have been affected by traditional concepts, and additional funds have been allocated for the construction of residential housing to update old houses. On the other hand, the Qinghai provincial government implemented the “Nomadic settlement project” in pastoral areas at the beginning of 2009, where a large number of nomadic pastoralists had built houses in their winter pasture. Driven by these two factors, the unique landscape pattern of the rural settlements in the northwest has been transformed gradually. However, due to the lack of spatial geographical data for rural settlements, especially in the sparsely populated northwest region of China, it is difficult to obtain large-scale, accurate data on rural settlements, which is the main reason there has been less research on

these settlements. Large-scale research, which is sparse, has focused on natural conditions (i.e., topography, climate factors) and size patterns of rural settlements (Tian, Qiao, & Zhang, 2012). However, the north-west region has complex natural geographical conditions and many diversified ethnic cultures and, therefore, it is necessary to carry out in-depth research on whether the leading industries, modern education, and religious beliefs play a role in shaping the spatial patterns of rural settlements.

Our main objective was to use methods of landscape ecology and univariate Local Moran's I to reflect the spatial morphology of rural settlements in multi-ethnic settlement areas. On this basis, we analyzed the relationships among different ethnic groups, leading industries, religious beliefs, modern education, and the characteristics of ethnic cultures of rural settlements to distinguish the dependence of rural settlements on modern education and religious beliefs. Our research would provide theoretical support for the spatial reconstruction of rural settlements on a large scale in the process of rapid urbanization from the perspective of ethnic cultural protection in China.

2. Study area

Qinghai Province is located in the northeastern part of the Qinghai-Tibetan Plateau (QTP) (E 89°35'–103°04', N 31°9'–39°19'), which covers about 30% of the total area of the QTP (Fig. 1), and this province is in the continental and the eastern monsoon, marginal climate zones. The average elevation of the area is 4100 m, and the terrain is high in the west and low in the east. Qinghai Lake, which is China's largest inland lake, is located in the northeastern region of the plateau. The South Qinghai Plateau (SQP) covers the entire western and southern areas, and it accounts for half of the total area of the province. In the west, at elevations of > 5000 m, snow cover and glaciers are distributed widely. South and northeast at about 2500–3000 m above sea level, there is a low-lying, multi-basin valley with a multi-level terrace system that is suitable for grazing and farming. The Qaidam Basin (QB) in the northwest, which is 2600–3100 m above sea level, has an annual precipitation that varies from 200 mm in the southeast to 15 mm in the northwest. Northeast of the Qilian Mountains (QM), there is a region with diverse landforms. The northern part of the area that is more than 4200 m in elevation is an important natural pasture. The southeastern part of the valley and the valley on both sides of the broad terraces have an average elevation of 2500 m, and this is an area of major food production. The valleys around the mountain at 4000 m above sea level, with the exception of a few hills with perennial snow, contain excellent pastures with abundant grass.

Since ancient times, the region of the east adjacent to the Gansu

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