



# Architectural Atlas and Differentiation Mechanisms of Vernacular Dwellings in Hunan and Guangdong

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**Abstract.** Although both Hunan and Guangdong lie in southern China, the Nanling Mountains separate them, creating contrasting natural and cultural contexts that condition vernacular dwellings. Existing research largely treats each province in isolation and seldom provides systematic cross-provincial comparison or visual synthesis. Using a cultural-geography lens, this study samples representative types: northern Hunan “Da Wu,” migrant settlements in southern Hunan, western Hunan stilted buildings, Guangfu vernacular dwellings, and courtyard-style dwellings in northern Guangdong. It then constructs an “Architectural Atlas of Traditional Vernacular Dwellings in Hunan and Guangdong” across five dimensions: architectural style, plan, elevation, structural system, and decorative arts. Results show that Hunan dwellings tend toward restraint and implicit expression, strong family orientation, and pragmatic adaptation to local conditions, reflecting inland Huxiang culture. Guangdong dwellings display greater openness, a balance between commerce and clan, and richer ornamentation, consistent with the maritime and inclusive Lingnan tradition. The Nanling range functions not only as a climatic barrier but also as a historical divider of cultural formation, producing systematic differences in architectural form, technology, and decoration. The atlas-based comparison clarifies how geographic barriers and cultural interaction jointly drive architectural evolution, offering a reference for heritage conservation and contemporary regional design.

**Keywords:** Hunan traditional residence, Guangdong traditional residence, Architectural Atlas

## 1 Introduction

Traditional architecture, as the solidification and expression of regional culture in physical space, is profoundly shaped by the natural environment, historical changes, and cultural customs. Hunan and Guangdong provinces, both situated in southern China, were historically regarded as “uncivilized lands,” separated by the extensive Nanling Mountain Range. Nanling is not only a significant physical geographical boundary but also a deep cultural divide, shaping the distinct regional cultural characters and development paths of the two areas. This dual differentiation in nature

and culture inevitably leaves distinct marks on their traditional architectural styles, making them ideal cases for studying the diversity of regional architecture in southern China.

Existing research primarily focuses on comparisons within individual provinces or delves into specific architectural elements. For instance, discussions on traditional dwellings of Hunan have clearly outlined the aesthetic differentiation among its three major regions: western, northern, and southern Hunan[1], while research on Guangdong's architecture concentrates on specialized areas such as Guangfu door and window decorations[2] or the gene atlas of northern Guangdong dwellings[3]. Although there is considerable accumulated research on the traditional architecture of Hunan and Guangdong individually, systematic comparisons are relatively lacking. Some studies have touched upon comparisons from the perspective of construction techniques, but overall, there is still a lack of a systematic analytical framework that integrates regional culture, spatial form, and construction technology across multiple dimensions. Particularly, there is a lack of an intuitive, systematic "Architectural Atlas of Traditional Vernacular Dwellings in Hunan and Guangdong" to clearly present the specific differences. Although former research constructed a gene atlas for northern Guangdong dwellings, it was not placed within a cross-regional comparative perspective. Therefore, conducting a holistic, atlas-based comparison of the traditional architectural styles of Hunan and Guangdong remains an urgent task. To address this gap, this paper focuses on the traditional vernacular dwellings of Hunan and Guangdong provinces, selecting representative types such as the "Da Wu" in northern Hunan, immigrant settlements in southern Hunan, stilted buildings in western Hunan, as well as Guangfu ancestral halls and courtyard-style dwellings in northern Guangdong as specific research subjects. A systematic comparison will be conducted around their stylistic differences, planar layout, elevation form, structural system, and decorative arts, leading to the construction of a visual "Architectural Atlas of Traditional Vernacular Dwellings in Hunan and Guangdong" that meticulously displays the similarities and differences between the two regions across multiple dimensions. Through this atlas construction, the core question is addressed: How are the natural and cultural barriers of the Nanling Mountains specifically reflected in the systematic differences between the traditional architectural styles of Hunan and Guangdong? What are the underlying historical-geographical mechanisms? This study will employ methods such as comparative analysis and literature review to complete the systematic research step by step. Simultaneously, a multi-dimensional comparative framework integrating regional culture, spatial morphology, and construction techniques will be constructed for a systematic cross-regional comparative analysis of the traditional architectural styles of Hunan and Guangdong. This comparison helps abstract traditional vernacular dwellings into individual cultural-geographical units, understand how geographical barriers specifically influence and divide the evolutionary paths of architecture on either side, and more systematically observe how natural barriers shape cultural differences. It can also provide cross-provincial references for the current preservation and innovation of regional architectural culture, such as offering foundations for the

systematic organization of literature, the formulation of architectural restoration principles, and the development of preservation plans.

## 2 Literature Reviews

Traditional architecture, as a material carrier of regional culture, has long attracted attention from multiple disciplines such as architecture, geography, and cultural anthropology regarding its stylistic differences. This study aims to systematically compare the spatial differences in traditional architectural styles between Hunan and Guangdong provinces and review related research.

Early research on Chinese traditional architecture mostly focused on macro-level philosophical ideas, spatial concepts, and construction systems, *Chinese Architecture and Town Planning 1500 B.C. – A.D. 1911*, traced of the context of Chinese architecture and urban planning layout[4]. In recent years, with the deepening of concepts like cultural landscape and heritage value, research has gradually shifted towards micro-regions and ethnic case studies. For example, applying space syntax theory to analyze settlement morphology or exploring the relationship between dwelling space organization and living patterns from an environmental-behavior perspective. These studies provide important theoretical tools and cross-cultural comparative perspectives, emphasizing architecture's adaptability as a living culture. However, their research objects are often widely recognized architectural types like Huizhou, Shanxi, or Southern Fujian Hakka styles. Systematic comparative research on transitional cultural zones on both sides of the Nanling Mountains in inland southern China, particularly between Hunan and Guangdong, remains relatively weak. Located in the transitional zone between Central Plains culture and Lingnan culture, the vernacular dwellings in the Nanling region have developed unique forms featuring both blending and differentiation of northern and southern styles. Studying the dynamic evolution of architectural styles in this transitional zone helps understand the specific roles of geographical location and cultural factors in regional interactions.

Research on Hunan's traditional architecture has formed a relatively clear regional division framework. Before researchers focused on comparisons while also pointing out the unique geographical and climatic features of central-southern Hunan. Other systematically categorized the differences[5], explicitly proposing a division into three major regions: western, northern, and southern Hunan, and succinctly summarized their aesthetic characteristics: the "rugged and romantic beauty" of western Hunan, the "restrained and elegant beauty" of southern Hunan, and the "outwardly simple yet inwardly refined beauty" of northern Hunan. This study profoundly explains the causes of these styles from the perspective of cultural blending (Central Plains, Chu, Ba-Shu, Hakka), providing a core basis for understanding the diversity of Hunan's architecture. Furthermore, specialized discussions on architectural details collectively build a multi-level research system ranging from macro-culture to micro-components[6]. These studies collectively indicate that the traditional architectural styles of Huxiang are deeply influenced by

the layering of diverse cultures and geographical environmental differences, forming an internally rich yet orderly landscape pattern.

Research on Guangdong's traditional architecture is also fruitful, focusing on sub-branches like the Guangfu, Chaoshan, and Hakka folk systems. Previous research deeply analyzed the characteristics of Guangfu architectural decoration—blending Chinese and Western elements with exquisite craftsmanship—reflecting the open, pragmatic, and compatible nature of Lingnan culture. Another methodologically innovative study introduced "landscape gene" theory to deconstruct and present a "gene"-level atlas of Zhuang ethnic dwellings in northern Guangdong from five dimensions: planar layout, elevation form, decorative arts, etc. This revealed the evolutionary patterns of architectural types under the blending of Zhuang and Han cultures, providing a cutting-edge paradigm reference for the quantitative and structured comparison of architectural culture[7].

However, rarely research directly focus on the comparisons between the two provinces. Previous study started from the perspective of adaptive construction techniques, revealed how the Nanling Mountains, as a natural and cultural dividing line, led to diverging technical paths in how dwellings on both sides responded to environmental factors like climate and topography. This study clearly pointed out the necessity of comparison but focused more on the technical level, leaving room for exploration regarding the systematic integration of overall architectural style, aesthetic culture, and their underlying driving mechanisms.

In summary, existing research has the issue of lacking comparisons between regions. Scholars have conducted in-depth and detailed explorations of the architecture within Hunan and Guangdong individually, making significant progress in areas such as cultural interpretation, technical analysis, and heritage preservation. However, existing achievements are mostly confined within administrative provincial boundaries or specific cultural regions. There is still a lack of an integrative analytical framework for the systematic comparison of architectural styles between the two independent cultural-geographical units (Huxiang culture and Lingnan culture) formed due to the barrier of the Nanling Mountains.

### **3 Construction of the Architectural Atlas**

Our research systematically translates the aforementioned cultural-geographical differentiation between Hunan and Guangdong into observable, comparable architectural language, thereby constructing an accessible "Architectural Atlas of Traditional Vernacular Dwellings in Hunan and Guangdong"(Table 1). The atlas construction is structured around five core dimensions: architectural style, planar characteristics, elevation form, structural system, and decorative arts, forming a multi-dimensional analytical framework for understanding the similarities and differences in two regions' architecture. We select representative samples including the northern Hunan "Da Wu," as shown in Figure 1, traditional dwellings in southern Hunan, as shown in Figure 3, western Hunan stilted buildings as shown in Figure 2, as well as Guangfu vernacular dwellings, like Figure 4 and northern Guangdong

courtyard-style dwellings like Figure 5. Through systematic comparison, we aim to render the abstract characteristics of "Huxiang culture" and "Lingnan culture" legible in the form, space, and craftsmanship of vernacular dwellings, and to clarify how the two regions developed architectural response systems that share common logic yet possess distinct characteristics due to diverge regional cultural orientations.



**Fig. 1.** Northern Hunan Da Wu.

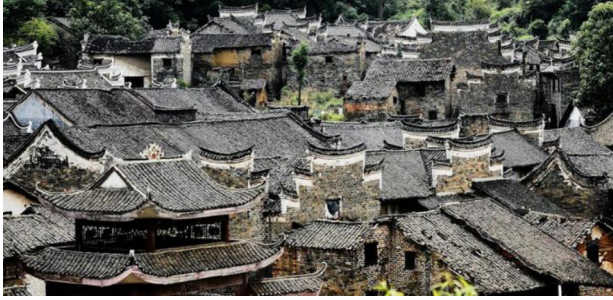
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**Fig. 2.** Western Hunan Stilted Building.

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**Fig. 3.** Southern Hunan Traditional Dwelling.

Source of the picture: <https://hn.rednet.cn/content/2019/10/21/6142216.html>



**Fig. 4.** Guangfu Vernacular Dwelling.

Source of the picture:

<https://soso.huitu.com/?kw=%E5%B9%BF%E5%BA%9C%E7%A5%A0%E5%A0%82>



**Fig. 5.** Northern Guangdong Courtyard-style Dwelling.

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### 3.1 Architectural Style

The traditional vernacular dwellings of Hunan and Guangdong are rooted in regional cultures and reflect adaptation to the natural and human environments. Although their

morphologies and aesthetic dispositions show significant differences, the formation of their styles follows shared logic shaped by interaction among "culture—environment—construction." Hunan's traditional dwellings overall exhibit core traits characterized by "restraint and implicitness, family-centricity, and adaptation to local conditions," deeply influenced by the pragmatic, land-attached, and ritual-respecting spirit of Huxiang culture. For example, the northern Hunan "Da Wu" integrates Central Plains ritual order with local living experience, reflecting an aesthetic orientation of outward simplicity and inward refinement, spatial centrality, and steadiness. In contrast, Guangdong's traditional dwellings are characterized by "openness, equal emphasis on commerce and clan, and elaborate decoration," tied to Lingnan culture's maritime orientation, commercial emphasis, and openness to foreign cultures. For instance, Guangfu dwellings are influenced by Sino-foreign commercial exchanges and craftsmanship techniques, featuring fine-grained ornamentation bold visual expression.

### **3.2 Planar Characteristics**

The traditional vernacular dwellings of Hunan and Guangdong both follow the basic logic of patriarchal ethics and multi-generational cohabitation in their spatial organization, commonly employing symmetrical layouts with clear sequences, reflecting the importance placed on ritual and order in both cultures. However, influenced by the different natural conditions and economic structures north and south of the Nanling Mountains, the planar forms of dwellings in the two regions have evolved into distinctive types and variations. Among Hunan's dwellings, the northern "Da Wu" often adopts courtyard or attached-courtyard layouts, commonly featuring "central hall flanked by side rooms" and multi-depth axial combinations, with rigorous spatial hierarchy and clear sequences; southern Hunan traditional dwellings form compact, aggregated, and flexibly adaptable planar forms in response to topography and ethnic distribution; western Hunan stilted buildings, adapting to steep slopes and waterfront environments, develop linear planar layouts with elevated pile-dwellings and elongated extensions, exhibiting strong regional adaptability. In Guangfu dwellings, due to developed commerce and limited land, urban dwellings commonly adopt compact "three-bay, two-corridor" layouts and have evolved into commercial-residential mixed planar types like arcade buildings (Qilou), reflecting strong practicality and commercial adaptability; northern Guangdong courtyards, while continuing the Central Plains courtyard form, are influenced by multi-ethnic cohabitation environments, forming progressive courtyard layouts with longitudinal parallel or lateral combinations based on the basic unit of an axially symmetrical courtyard, synthesizing ritual characteristics and minority ethnic styles.

### **3.3 Elevation Features**

The architecture of Hunan and Guangdong both exhibit shared elevation genes due to geographical constraints. However, differentiation arises from cultural influences: Huxiang architecture expresses more of the restraint of Central Plains culture, while

Guangfu architecture appears bolder due to strong foreign cultures. For common adaptation to the rainy, humid, and hot climate, dwellings in both regions generally use overhanging-gable or flush-gable roofs as basic configurations, serving as the structural basis for drainage and enclosure. Fire prevention in hot summers also increases reliance on gable walls. However, driven by regional aesthetics and cultural character, obvious differences emerged in the expression of elevation forms. Huxiang traditional dwellings tend to maintain straight and plain lines. Their gable walls mostly adopt stepped fire gables, primarily serving the practical functions of wind and fire protection. Exterior colors often maintain the simple tones of black tiles, white walls, or the natural color of wood, with a relatively restrained visual language. In contrast, Guangfu dwellings are more expressive in elevation form. Their gable walls adopt the wok-ear gable form[9], emphasizing decorative expressions like upturned eaves, glazed surfaces, and glazed tiles beyond fire and wind protection functions, highlighting horizontal ridge decorations and excelling in fine carvings on lintels and window frames.

### 3.4 Structural System

The traditional dwellings of Huxiang and Guangfu share a timber-frame foundation, yet evolved distinct technical paths and construction logic driven by environmental constraints. Huxiang traditional dwellings prioritize post-and-lintel framing, incorporating column-and-tie elements to expand space. To combat moisture, southern Hunan uses elevated foundations, while stilted buildings in western Hunan employ pile-dwellings to adapt to sloping and waterfront environments. Their mortise-and-tenon and purlin systems emphasize flexible disassembly and maintenance, reflecting adaptation to natural topography. Conversely, Guangfu dwellings face typhoon risks, evolving into robust brick-timber structures with masonry enclosures. In towns, large Guangfu houses and ancestral halls often masonry brick or stone enclosure walls outside the timber frame and use stone masonry platforms to strengthen the foundation structure. Furthermore, since modern times, with commercial development in the Guangfu region, to adapt to street-front commercial needs, Modern commercialization further introduced Guangfu dwellings actively absorbed Western architectural techniques to create the unique arcade Qilou system, masterfully blending wood, brick, and concrete[8].

### 3.5 Decorative Arts

Decorative arts embody cultural expression in the traditional vernacular dwellings of Hunan and Guangdong. Both regions serving ritualistic functions focused on key locations like roof ridges, under eaves, doors, and windows. Differences mainly manifest in decorative style, thematic sources, and color choices. The Hunan region, relatively inland, saw its cultural development primarily influenced by Central Plains culture, resulting in a more realistic and steady decorative style. Decorations mainly include wood carving, stone carving, and beam-and-purlin paintings, emphasizing the texture of the materials themselves. Themes often originate from folklores, clan

history, agricultural life, and natural imagery, possessing strong local ethics and agrarian cultural colors. Color application is relatively restrained, based on the original colors of the materials like wood, stone and lime. Paintings are commonly seen on beams and purlins, with color schemes primarily in blue, black, white, and ochre. The overall style is simple and substantial, with an introverted artistic conception, coordinating with the overall inward character of the architecture. The Guangdong region, being coastal, was earlier influenced by maritime and commercial cultures, therefore, its decorative style exhibits stronger openness, forming a craft system of "three carvings and two moldings" (wood, stone, brick carvings; lime molding, ceramic molding), combined with materials like embedded porcelain, glazed tiles, glaze colors, and stained glasses. Themes not only encompass traditional auspicious patterns and clan symbols but also incorporate maritime cultural elements, commercial motifs, and even Sino-Western blended patterns. Colors are sharply contrasted, with rich decorative layers, commonly using bright colors like red, green, gold, blue. The overall effect is ornate and exquisite, visually bold, highlighting its outward, expressive architectural temperament.

**Table 1.** Construction of Comparative Atlas for Hunan and Guangdong Architecture

Architecture	Hunan-Style Architecture	Guangdong-Style Architecture	Common Points
Architectural Style	Restrained & implicit, family-centric, adapts to local conditions.	Open & outward, commerce & clan equally emphasized, elaborately decorated.	Both use clan ritual order as the ethical basis for spatial organization.
Planar Features	Northern Hunan: mainly courtyard or attached-courtyard layouts. Western and Southern Hunan: linear or compact layouts adapting to topography.	Mainly "three-bay two-aisle" form, includes commercial space utilization forms like arcade buildings.	Basic logic of patriarchal ethics & family cohabitation, generally use symmetrical layouts with clear sequences.
Elevation Form	Form Gable walls mostly use stepped fire gables; exterior colors maintain simple tones of black and white walls or natural wood; visual language relatively restrained.	More expressive & outward in form; gable walls use wok-ear gables, emphasizing decoration beyond fire and wind protection; emphasizes horizontal ridge decor, fine carvings on lintels and window frames.	Both generally use overhanging/flush gable roofs as basic configuration, use gable walls for fire protection.
Structural System	Primarily post-and-lintel timber framing, partially combined with column-and-tie. Western Hunan developed pile-dwelling system.	Brick-timber mixed structure, absorbed Western concrete technology, and arcade buildings often use colonnade structures.	Both primarily use timber framing as core.
Decorative Arts	Crafts mostly wood	Crafts include "three	Both serve cultural needs of

	and stone carving, emphasize material itself; themes more realistic—folklores, clan history, agrarian life, natural imagery; colors mainly use blue, black and white.	carvings two moldings," incorporate stained glass, glazed tiles, embedded porcelain; themes cover traditional auspicious patterns, clan symbols, commercial elements, Sino-Western blends; colors sharply contrasted, rich decorative layers, overall ornate & visually bold.	clan ritual, blessing prayers, evil ward; often feature artistic treatment at key parts like roof ridges, under eaves, doors/windows.
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## 4 Conclusion

This study attempted to construct a multi-dimensional system covering architectural style, planar form, elevation style, structural system, and decorative symbols, transforming traditional vernacular dwellings into comparable, analyzable spatial and formal language. Hunan displays internal sub-regional diversity. While Guangdong reflects Lingnan fusion and pragmatism. The Nanling Mountain Range, as a key barrier factor, directly led to fundamental differences in how the two regions coped with climate, subsequently influencing technical strategies regarding building materials, spatial organization, ventilation, and damp-proofing. On a deeper level, it also historically separated climatic coping strategies and cultural formation paths.

Conservation strategies should prioritize Hunan's "regional differentiation" and Guangdong's "cultural unit integrity". More importantly, the two regions can establish a joint preservation perspective across the Nanling north-south divide, respecting differences while paying attention to their interactions, so that traditional architecture not only exists as static heritage but also becomes a cultural resource strengthening regional identity and inspiring contemporary design.

Future work requires further deepening in methodology and application. On one hand, the research paradigm urgently needs to shift from "qualitative interpretation" to "quantitative empirical" studies. Future research could introduce quantitative analysis techniques, using data to further analyze the scientific mechanisms of environmental adaptability[10]. On the other hand, cutting-edge digital technologies should be combined to expand the preservation and application dimensions of the atlas. Additionally, utilizing Historic Building Information Modeling (HBIM) technology to

transform two-dimensional atlases into three-dimensional digital gene libraries, and using parametric modeling to analyze the variation patterns of architectural components, can not only provide a high-precision data foundation for the digital preservation and precise restoration of regional architecture but also offer a basis for exploring the modern translation paths of traditional construction wisdom.

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