

Geo-Cultural Factors Shaping Traditional Residential Architecture in Eastern China: A Comparative Study of the Hui, Su, and Fujian Styles

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ABSTRACT

This research paper is dedicated to the traditional residential architecture of Eastern China and the geo-cultural factors that shaped it. The focus is on dwellings that emerged in similar climatic conditions but developed into different structures built from the same set of elements. China is one of the world's oldest civilizations, and the traditions carried across centuries have shaped construction and design as a response to regional conditions. The research covers six provinces, Jiangsu, Zhejiang, Anhui, Jiangxi, Fujian, and Shandong, and three architectural styles that left a mark on them: Hui, Su, and Fujian. Hui style is found in Anhui and Jiangxi, where villages such as Xidi and Hongcun have found their place as UNESCO World Heritage Sites. Jiangsu and Zhejiang, known together as Jiangnan, are recognized for the classical gardens that accompany the homes and for the water architecture the region is famous for. The mountainous areas of Fujian and Shandong prompted the use of locally sourced stone and rammed earth, and the Tulou houses of Fujian represent an important example of vernacular history. The study uses a comparative qualitative method supported by a case study of representative sites. The results show that climate alone does not explain the differences between the styles. Anhui and Jiangxi share the same Hui architecture despite clearly different climates, which points to cultural transmission rather than environmental need. Confucian philosophy and Feng Shui principles shaped the courtyard layout, the placement of the gate, and the symbolic detail across all six provinces. This research views architecture as a living heritage that reflects the identity of Chinese communities, where geography gives the material and culture gives the plan.

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I. INTRODUCTION

Vernacular architecture has evolved as a reflection of human civilization and history, following the influence of environmental, social, and cultural factors. It is a style of architecture rooted in the use of locally sourced materials and traditional techniques of building. That is what enables us today to see the way ancient communities adjusted to their surroundings and to the resources they had. Besides providing shelter and safety, residential architecture also reflects the identity of a community and of the individual (Cohen, 2018). The origins of Chinese residential architecture are traced back to the Neolithic age, when the first dwellings appeared near present-day Xi'an (Huang, 2016).

China is a land of vast diversity, deeply rooted in a rich history and cultural heritage. The country can be divided into six climate regions depending on geographical location, topography, altitude, and other factors (Chen & Zhu, 2015). These regions have shaped diverse architecture over the millennia, through the use of various materials and the development of methods for protection from the weather (Li, 2017). Eastern China consists of six provinces: Jiangsu, Jiangxi, Fujian, Shandong, Zhejiang, and Anhui. Within this area a temperate continental climate is dominant, occasionally showing subtropical and mountainous characteristics.

Every province of Eastern China has a rich and unique tradition shaped by geo-cultural factors. Three architectural styles developed here, and the names of the styles, Hui, Su, and Fujian, are derived from the names of the provinces themselves (Liu, 2015). Climatic conditions such as temperature, precipitation, and wind had a significant impact on the choice of material and on the design of the houses. Tradition, myths, and religious beliefs shaped them as well. Detailed carvings have the symbolic meaning of inviting good fortune, while the roofs are turned towards the inner courtyards to collect rainwater, which was believed to summon prosperity for the family (Li, 2019).

This is where the question of the present research begins. The six provinces sit within a fairly narrow climate range. If climate were the main force behind building form, their houses should look broadly alike, but

they do not. The main goal of this research paper is to determine how geo-cultural factors, and not climate alone, shaped the residential architecture of the Eastern Chinese provinces. The study argues that culture and tradition, rooted mainly in Confucianism and Feng Shui, set the underlying logic of these houses, while geography and climate determine what they are built from. Two situations make this possible to examine. Where the climate differs between provinces but the architecture does not, culture is doing the work. Where the architecture depends on a specific landscape feature, geography sets the limit. Both situations appear in Eastern China, and both are examined here.

II. MATERIAL AND METHODS

The aim of this research is a deeper understanding of the residential architecture of Eastern China, focusing on the specific elements of the regional styles of Jiangsu, Jiangxi, Zhejiang, Anhui, Fujian, and Shandong. Drawing on the literature review, the study uses a comparative qualitative method supported by a case study of representative sites.

The comparative method examines the structural elements, the materials used, and the environmental adaptation of each style, while using visual documentation to illustrate the differences and the similarities. General climatic conditions in each region, covering temperature, humidity, and precipitation, are described from published sources and set against the architectural findings. This shows whether variation in building form follows variation in climate.

Representative sites anchor each style. Suzhou and the water towns of Jiangsu and Zhejiang stand for Su style. Xidi and Hongcun in Anhui, together with the villages around Wuyuan in Jiangxi, stand for Hui style. The Tulou cluster at Tianluokeng stands for Fujian. Shandong is treated on its own, since its stone building tradition sits outside the three named styles. Figure 1 shows how the styles are distributed across the six provinces.

The resources and primary data used for the study are published research papers, books, and architectural documentation. No field survey was carried out, which limits the study to what other researchers have already recorded. The implications of that are taken up in the discussion.

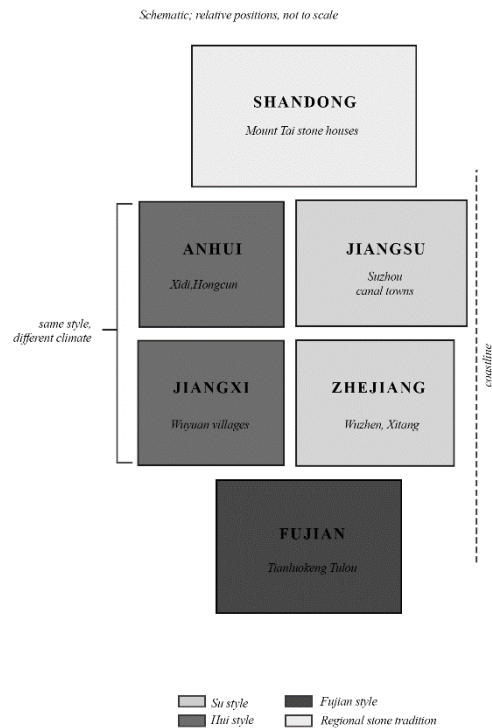


Figure 1: Distribution of regional building styles across the six provinces of Eastern China. Schematic drawing by the author.

III. CASE STUDY: REGIONAL ANALYSIS OF ARCHITECTURAL STYLES

The analysis is organized by style rather than by province, because Hui style crosses a provincial border and comparing it province by province would obscure that.

Jiangsu and Zhejiang: Su Style

Jiangsu and Zhejiang are two provinces of Eastern China known for their rich history, culture, and architectural heritage. The region is known under the name Jiangnan and is abundant with river canals forming an intricate water labyrinth. Jiangsu, located on the east coast, borders the Yellow Sea and has fertile, flat landscapes shaped by the Yangtze River. Nanjing, its capital, has been an important political and cultural center of China's history. Zhejiang, situated south of Jiangsu, features a more mountainous topography with a coast along the East China Sea, and its capital Hangzhou has long been renowned as a major center for Chinese silk production (Fairbank & Goldman, 2006).

These provinces have long been linked to some of the most well-known forms of traditional Chinese architecture, especially in the city of Suzhou. The city's water towns, often called the Venice of the East, are made up of houses built along the river canal, with bridges and narrow stone-paved streets blended into the landscape. The houses stand closely next to each other, connected by alleyways, and they reflect the ancient Confucian philosophy of balance with nature. They are known for their white walls, black tiles, and intricate wooden carvings presented through detail (Yuan, 2002). Traditional houses often include courtyards designed to allow proper sunlight and air circulation, and they are aligned with geomantic principles believed to channel positive energy and ensure prosperity (Knapp, 2005).

The ground floors of these urban structures were usually reserved for commercial space, allowing the household to trade along the water canals. The kitchen and pantry were situated along the riverside, while the common areas and bedrooms were oriented towards the private inner courtyards, an arrangement set out in Figure 2(a). Their size depended on the wealth of the family owning the property, and wealthier families built massive and complex structures with plenty of rooms and several inner courtyards. These houses were often equipped with spirit walls, which served to ward off evil spirits as believed by the philosophy of Taoism, and were carved with dragon motifs and symbols of good luck (Chazen Museum of Art, n.d.). Rainwater drainage, known as Si Shui Gui Tang, is a system of directing rainwater from the roof to the center of the courtyard using gutters. According to cultural beliefs, the accumulation of water in the heart of the courtyard brings prosperity and invokes the wealth of the household (Yu, 2017).

The architecture of Zhejiang is very similar to Jiangsu, although it has its own design shaped by the landscape and topography. The houses are built to accommodate the hilly terrain, often using locally sourced materials such as bamboo and wood. Construction styles include raised platforms and overhanging eaves designed to protect the house from heavy precipitation and humidity, and to allow for proper ventilation (Zhu, 2018). Ancient villages such as Wuzhen and Xitang are prime examples of this tradition, with narrow streets, carved wooden bridges, and homes along the river canal (Wang, 2020). The classical gardens of Suzhou, many of which have found their place as UNESCO World Heritage Sites, combine water, rocks, trees, and pavilions in a carefully planned layout, and they were designed to serve as spaces for relaxation, art, and poetry rather than for visual beauty alone (Yuan, 2002).

Anhui and Jiangxi: Hui Style

Anhui province is located in the inner part of Eastern China, oriented towards mountainous Central China. Jiangsu and Zhejiang border Anhui to the east, divided by the rivers Yangtze and Huai. The diverse topology of the province includes plains, hilly regions, and the Huangshan mountains, and all of these geographical features have shaped the historical development and the architectural styles present in the region. The landscape diversity along with the humid climate created favorable conditions for the agricultural activities of Anhui, establishing it as an important center for rice production in China (Wang, 2018).

One of the most notable treasures of Anhui province is its ancient villages and the residential architecture that developed within the Hui culture. The style shares its name with the culture itself and is characterized by harmonious integration with nature, complex wood carvings, and the usage of locally sourced materials. The houses are oriented towards the inner courtyard, which represents the heart of the home, as shown in Figure 2(b). The walls are white, with black tile roofs and distinctive horse head walls, designed specifically to prevent fires from spreading between the homes. This ancient design is very functional in areas of rural Anhui, where the homes are tightly packed and made predominantly from wood, making them vulnerable to fire hazards (Li & Zhu, 2019).

Among the most famous villages that portray the traditional architecture of Anhui are Xidi and Hongcun, both proclaimed UNESCO World Heritage Sites. The villages have often been named living museums, for preserving the Hui style almost in its original form. Xidi dates back more than 900 years and is known for its preserved structures of the Ming and Qing dynasties, including complex carvings on wooden

doors, windows, and eaves. Hongcun has a distinct ox shape and is famous for the waterways flowing directly through the village. The layout channels water into the residents' homes through an internal system, so that every household has access to clean water and the water is cooled during the hot summers of Anhui. This system reflects the ancient Chinese wisdom of harmonizing living spaces with natural surroundings (Yuan, 2021).

Jiangxi lies immediately south, bordered by Anhui to the north and Fujian to the east, with the Gan River flowing through most of the province. The climate is subtropical and monsoon, with hot and humid summers and mild winters, noticeably different from the conditions in Anhui. Despite this, Hui architecture has found its place in Jiangxi as well. The ancient dwellings are made from locally sourced materials such as wood, stone, and clay brick, and the structures often have raised ground floors to prevent moisture from infiltrating the home. Like the houses of Anhui, they are organized around a central courtyard and carry the same distinctive horse head walls (Li & Chen, 2021). The courtyards also served as communal spaces for family activities and religious ceremonies, and the homes sometimes accommodated multiple generations of one family under one roof (Zhao, 2020).

This shared architecture across two climatically different provinces is key information in the research, showing that culture and tradition are often prevalent against climate. Wuyuan is famous for its well-preserved Ming and Qing dynasty villages, among them Likeng, Huangling, and Xiaoqi. These villages have a distinctive Hui-style look, with whitewashed walls, black-tile roofs, and intricate wooden carvings. In comparison to Suzhou, the gardens in the traditional residences of Jiangxi are more humble and functional, serving as places for family gatherings rather than as decorative landscapes (Zhu, 2021).

Fujian: Tulou and Min-Style Houses

Fujian is a coastal province located along the Taiwan Strait, bordering Zhejiang to the north, Jiangxi to the west, and Guangdong to the south. The geography of the province is diverse, with mountains and hills stretching through the middle part, numerous rivers, and a long coastline. The climate is subtropical, with high humidity and precipitation in the monsoon season, and these conditions have shaped the design and materials used in traditional dwellings. The architectural history of Fujian is tightly connected to its cultural diversity, since the region was home to various ethnic groups such as the Hakka, Hoklo, and She people, all of whom had a great impact on its structural development (Liu, 2018).

The most famous structures of Fujian are the Tulou buildings, shown in Figure 2(c). They were built by the Hakka people, dating back to the Song and Yuan dynasties. Tulou are huge circular or rectangular structures that act as residential homes for multiple families rather than for a single household. They were built from rammed earth, wood, and stone, with thick walls designed to act as insulation, foundation, and defense against robbery. The technique of ramming earth includes compacting layers of soil, which creates durable walls that last for centuries with very minimal maintenance. Every building includes multiple floors, and the same layout is seen throughout: the ground floor serves as a place for storage and livestock, the second floor for kitchens, and the rest of the floors for living spaces. The inside is organized around a central courtyard serving as a communal space for gatherings and ceremonies, with an altar placed in the middle, devoted to gods or ancestors. The windows are small and placed high on the outside walls, enabling proper ventilation while ensuring safety (Lin, 2017). The structure's simplicity on the outside hides the architectural mastery of design on the inside, and the Hakka Tulou are listed as UNESCO World Heritage Sites.

The architecture of Fujian includes other types of traditional dwellings, such as Min-style houses. These are characterized by white walls, gray-tile roofs, and decorative eaves that curve towards the sky. The houses are decorated with complex wooden carvings and ornaments that reflect local customs and beliefs, while the upturned roofs are primarily designed to ensure proper rainwater drainage and to protect the wooden elements from rainfall (Chen, 2019).

Shandong

Shandong is a coastal province bordered by the Yellow Sea and the Bo Hai Gulf to the east. The name Shandong, meaning east of the mountains, comes from its position east of the Taihang Mountains. The province spans two areas of distinct geographical diversity, with fertile agricultural land inland and a peninsula known for its coastline and sea traditions. In areas below Mount Tai the homes are often built from cobblestones found in nearby riverbeds, using traditional techniques such as dry-stone walling, which requires extensive knowledge and craftsmanship. Architectural traditions of Shandong also include the principles of Feng Shui, recognized in the layout of the homes. The gate is usually placed southeast, aligned with traditional beliefs, and the inner courtyard is surrounded by a series of rooms with a gable roof and wooden beams. The outside walls of the courtyard are positioned to ensure complete privacy of the home (Yuan, 2021). Along the Yellow River and its tributaries, the riverside dwellings evolved to adjust to frequent floods through the use of resilient and durable materials.

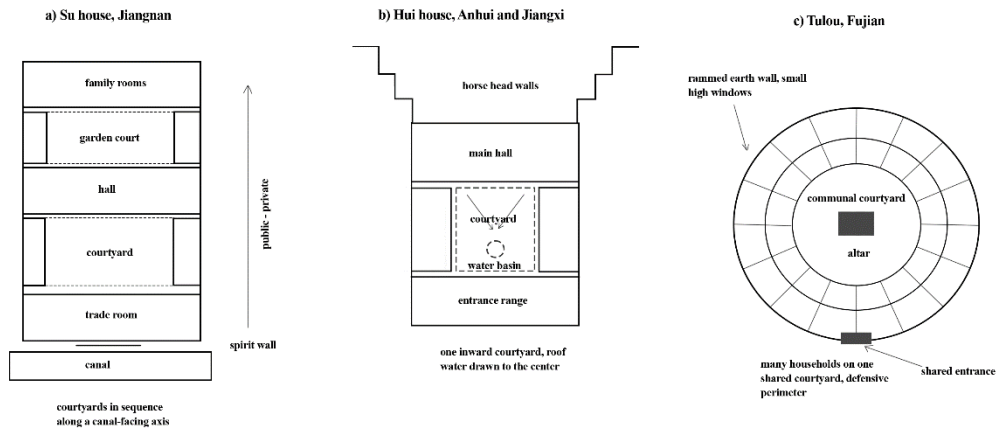


Figure 2: Comparative courtyard plans. (a) Su house, Jiangnan. (b) Hui house, Anhui and Jiangxi. (c) Tulou, Fujian. Schematic drawings by the author.

IV. RESULTS

Table 1 places the six provinces side by side. Read across the rows, the inner courtyard appears in every one of them, in every climate and on every type of terrain. What changes is the purpose it serves. In Su houses the courtyard carries aesthetic and social weight, a space made to be seen. In Hui houses it gives privacy to the family and contains fire within the walls of a single home. In a Tulou it is a communal and ritual space serving dozens of people at once. The form stays while the function shifts, which shows how deeply the courtyard is embedded in Chinese building culture.

Table 1: Comparative summary of regional characteristics across the six provinces

Province	Style	Climate	Main materials	Courtyard function	Identifying feature
Jiangsu	Su	Temperate and humid; canal lowland	Timber frame, white plaster, black tile	Light, air, and social display; separates canal-facing trade space from family rooms	Si Shui Gui Tang roof drainage; spirit wall; ornamental garden
Zhejiang	Su	Temperate to subtropical; hilly, high rainfall	Bamboo, timber, stone paving	Light and air on sloping ground	Raised platforms; deep overhanging eaves
Anhui	Hui	Temperate; mountainous interior	Timber frame, white lime wall, black tile	Privacy and fire containment; rainwater collection	Horse head stepped gable; inward roof pitch
Jiangxi	Hui	Subtropical monsoon; hot humid summers	Timber, stone, clay brick	Privacy and ventilation; multi-generational family space	Horse head gable; raised ground floor against damp
Fujian	Fujian	Subtropical monsoon; mountainous and coastal	Rammed earth, timber, stone footing	Communal gathering and ancestor ritual for many households	Tulou ring form; small high windows; single entrance
Shandong	Regional stone	Temperate continental; coastal and plain	River cobblestone, dry-stone walling, timber beams	Privacy behind a walled perimeter	Dry-stone construction; southeast gate per Feng Shui

The styles did not follow climate as closely as expected. Anhui and Jiangxi are the decisive case, since these are two provinces with different climates and the same architecture. If environmental pressure were the primary force, the hot and humid summers of Jiangxi should have pushed its builders away from the Anhui model, and they did not. Su style makes the opposite point. It is inseparable from the canal network of Jiangnan, and no amount of cultural transmission would reproduce it on dry ground.

Feng Shui and Confucian principles run through all of it. Gate orientation, courtyard placement, water channeled for prosperity, and carved symbols of dragons, phoenixes, and floral motifs recur from Jiangsu to Fujian with only local variation. Underneath the visible differences in material and form there is a shared symbolic vocabulary that ties the six provinces together.

Water shaped construction everywhere, though never in the same way. Jiangsu turned its houses towards the canal for trade and transport. Hongcun ran water through the village itself to reach every household. Shandong built against the river rather than towards it, adapting to a waterline that moves. In each case the response is practical and symbolic at once, and the two are difficult to separate.

Taken together, geography accounts for the material and the technique, culture accounts for the layout and the meaning, and neither one explains these buildings on its own.

V. DISCUSSION AND CONCLUSION

The results support the argument set out at the beginning. The vernacular architecture of Eastern China responds to the land and to the culture together. Stone in Shandong, rammed earth in Fujian, bamboo and timber in Zhejiang are answers to the environment. The courtyard plan, the symbolic carving, and the spatial hierarchy that places family rooms behind and trade rooms in front are answers to the culture, and they hold across provinces that share very little climatically.

This distinction matters for heritage conservation. Treating these houses as physical objects to be stabilized preserves the material and loses the reasoning behind it. A restored courtyard that no longer collects water, or a horse head wall kept on a street where nothing burns, holds the form and drops the meaning. Any approach that reads regional style as a purely climatic response will tend to flatten the cultural layer, which this research finds to be at least as important.

The main limitation of the study is the absence of fieldwork. Everything presented here rests on what other researchers have already documented, and the literature is uneven, since Jiangsu and Anhui are well covered while Shandong is far less so. Direct site documentation in the less-studied provinces would test these findings properly, and would make it possible to say something about the current condition and use of these buildings, which secondary sources rarely record.

The research question asked how geo-cultural factors shaped the residential architecture of Eastern China. On the evidence gathered here, tradition set the plan and the land set the fabric. Six provinces within one climate band built six recognizably different architectures, and the differences trace back to history, ethnicity, and belief rather than to weather. The connection all these provinces share comes from a culture rooted in Confucianism, while the geographical diversity of Eastern China gave every province its own identity. That is what makes this architecture worth studying as a record of the region and not simply as a catalogue of old houses.

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