

Spatial Distribution Dataset of 357 Sites of Provincial Toponymic Cultural Heritage in Jiangsu Province

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Abstract: The toponym, as a linguistic symbol, reflects and symbolizes the long-standing historical context of a nation, a region, or even a country. Consequently, toponyms have become a significant resource for cultural heritage and continue to evolve over time and space. Jiangsu Province is rich in toponymic cultural resources with profound cultural characteristics. In recent years, several initiatives have been undertaken to protect toponymic heritage and preserve its historical context. This provincial toponym cultural heritage assessment work is jointly organized by six departments: the Jiangsu Provincial Department of Civil Affairs, the Department of Housing and Urban–Rural Development, the Department of Transport, the Department of Water Resources, the Department of Culture and Tourism, and the Local Chronicles Office. Based on two provincial toponym cultural heritage lists published in 2022 and 2023, a mapping relationship between ancient and modern toponymic cultural heritage was established by referring to the Encyclopedic Dictionary of Ancient and Modern Chinese Geographical Names. Spatial location information for each item of toponym cultural heritage was obtained from the China National Toponym Database to construct a spatial distribution dataset of provincial toponymic cultural heritage in Jiangsu. This dataset includes the name, batch, heritage type, current toponym, and administrative division for each cultural heritage item. The dataset was archived in the .shp and .xls formats, comprising 9 data files with a total size of 1.66 MB (compressed into a single file of 72 KB).

Keywords: toponym; cultural heritage; spatial distribution; Jiangsu Province

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1 Introduction

Toponyms are the specific names given by humans to natural and cultural geographic entities that contain the “genetic code” of their formation, evolution, and scientific significance^[1]. Resolution nine of the sixth United Nations Conference on the Standardization of Geographical Names states that “Toponyms hold significant cultural and historical value, and arbitrary changes to them can result in the loss of inherited cultural and historical traditions”. Many countries regard the protection and research of toponymic cultural heritage as an essential part of their scientific research and work in this area^[2]. In January 2017, the General Office of the Central Committee of the Communist Party of China and the General Office of the State Council issued the Opinions on Implementing the Project of Inheriting and Developing Fine Traditional Chinese Culture^[3], which explicitly identifies “promoting the protection of toponym cultural heritage” as an important task in protecting and inheriting Chinese cultural heritage in the new era. In his report at the 20th National Congress of the Communist Party of China in October 2022, Xi Jinping emphasized the need to strengthen the protection of cultural relics and cultural heritage, as well as enhance the protection and inheritance of historical culture in urban and rural construction. Driven by the “Cultural Power Strategy”, the protection of toponym cultural heritage in China has entered a new phase of development. Led by the Ministry of Civil Affairs, a national toponym cultural heritage database has been established, the cultural evaluation standards for toponyms have been improved, and the identification of toponymic cultural heritage such as “Millennium Ancient Counties” has been vigorously promoted, ensuring that toponymic cultural heritage is protected by category, level, and hierarchy^[4]. Meanwhile, local governments striving to achieve practical results have adapted to local conditions by developing their own methods to implement protection lists for toponymic cultural heritage^[5–7].

As one of the birthplaces of Chinese civilization, Jiangsu Province is endowed with extremely rich toponymic cultural resources and distinctive toponymic cultural characteristics^[8,9]. In recent years, Jiangsu has undertaken multiple initiatives to protect toponymic culture and continue its historical legacy. In 2022, the General Offices of the Jiangsu Provincial Party Committee and the Provincial Government issued the Implementation Opinions on Strengthening the Protection and Inheritance of Historical Culture in Urban and Rural Construction^[10], which identified the protection of toponymic cultural heritage as a key component of urban and rural historical and cultural heritage protection. A provincial leadership group was then established. This group required multiple departments to collaborate on protecting and inheriting urban and rural historical cultural heritage. That same year, Jiangsu became the first province in China to initiate the evaluation of toponymic cultural heritage. Under the joint leadership of six departments—the Provincial Department of Civil Affairs, the Department of Housing and Urban–Rural Development, the Department of Transport, the Department of Water Resources, the Department of Culture and Tourism, and the Local Chronicles Office—623 municipal-level examples of toponymic cultural heritage were recommended and submitted for provincial evaluation according to a hierarchical application process. The first list of provincial toponymic cultural heritage, including ancient cities, ancient towns, and ancient villages, was subsequently published^[11]. In 2023, Jiangsu expanded the evaluation to include toponyms for roads, streets, alleys (lanes), and ancient bridges^[12]. This dataset provides spatial point data for 357 provincial items of toponymic cultural heritage from two batches in Jiangsu Province and includes information such as the batch, type, administrative division, and location of each example, offering foundational data to describe the distribution characteristics of Jiangsu’s provincial toponymic cultural heritage. This dataset also holds significant value for the revelation, protection, and inheritance of regional historical and cultural resources.

2 Metadata of the Dataset

The metadata for the Spatial distribution dataset of 357 sites of provincial toponymic cultural heritage in Jiangsu Province^[13] is summarized in Table 1. It includes the dataset full name, short name, authors, year of the dataset, data format, data size, data files, data publisher, and data sharing policy, etc.

Table 1 Metadata summary of the dataset

Items	Description
Dataset full name	Spatial distribution dataset of 357 items of provincial toponymic cultural heritage in Jiangsu Province
Dataset short name	TopCulHer_Jiangsu_2022-2023
Authors	Ye, P., Urban Planning and Development Institute, Yangzhou University; College of Architectural Science and Engineering, Yangzhou University, 007839@yzu.edu.cn Yang, M., Urban Planning and Development Institute, Yangzhou University; College of Architectural Science and Engineering, Yangzhou University, 008120@yzu.edu.cn He, J., Research Institute of Central Jiangsu Development, Yangzhou University, 008161@yzu.edu.cn He, H. M., Urban Planning and Development Institute, Yangzhou University; College of Architectural Science and Engineering, Yangzhou University, 008028@yzu.edu.cn Liu, Y. P., Urban Planning and Development Institute, Yangzhou University; College of Architectural Science and Engineering, Yangzhou University, 006958@yzu.edu.cn
Geographical region	Jiangsu Province of China, covering 13 municipal administrative regions
Year	2022–2023
Data format	.shp, .xls
Data size	1.66 MB (Compressed into one file with 72 KB)
Data files	9 data files (1 compressed file)
Foundations	National Natural Science Foundation of China (42301522); Humanities and Social Sciences Foundation of Yangzhou University (xjj2021-08); Key Project of Social Science Research in Yangzhou City (2024YZD-005)
Data publisher	Global Change Research Data Publishing & Repository, http://www.geodoi.ac.cn
Address	No. 11A, Datun Road, Chaoyang District, Beijing 100101, China
Data sharing policy	(1) <i>Data</i> are openly available and can be free downloaded via the Internet; (2) End users are encouraged to use <i>Data</i> subject to citation; (3) Users, who are by definition also value-added service providers, are welcome to redistribute <i>Data</i> subject to written permission from the GCdataPR Editorial Office and the issuance of a <i>Data</i> redistribution license; and (4) If <i>Data</i> are used to compile new datasets, the ‘ten per cent principal’ should be followed such that <i>Data</i> records utilized should not surpass 10% of the new dataset contents, while sources should be clearly noted in suitable places in the new dataset ^[10]
Communication and searchable system	DOI, CSTR, Crossref, DCI, CSCD, CNKI, SciEngine, WDS, GEOSS, PubScholar, CKRSC

3 Methods

We collected the data and information from the provincial toponymic cultural heritage in Jiangsu from two batches in 2022 and 2023 and established a mapping relationship between ancient and modern toponyms at the heritage sites with reference to the Encyclopedic Dictionary of Ancient and Modern Chinese Geographical Names^[15]. Using the National Database for Geographical Names of China¹ released by the Ministry of Civil Affairs, the administrative divisions and geographic coordinates of each toponymic cultural heritage item were obtained. These data were visualized as the spatial distribution of Jiangsu provincial toponymic cultural heritage using ArcGIS.

3.1 Data Sources

The Jiangsu Provincial toponymic cultural heritage originated from relevant notifications published on the official website of the Jiangsu Provincial Department of Civil Affairs². The

¹ National Database for Geographical Names of China. <https://dmfw.mca.gov.cn>.

² Jiangsu Provincial Department of Civil Affairs. <https://mzt.jiangsu.gov.cn>.

names of these notifications, their release dates, and the number of heritage items are presented in Table 2.

Table 2 Relevant notices of national key protected cultural relic units

Batch	Notification	Release time	Unit quantity
The first batch	Notice on Publishing the List of Provincial Toponymic Cultural Heritage in 2022	2022.11.08	200
The second batch	Notice on Publishing the List of Provincial Toponymic Cultural Heritage in 2023	2023.11.02	157

There are five categories in the published lists for Jiangsu provincial toponymic cultural heritage: ancient cities; ancient towns; ancient villages; ancient bridges; and roads, streets, alleys (lanes). The basic conceptual definitions for each type of toponymic cultural heritage are outlined in Table 3 and were obtained from reference^[16].

Table 3 Conceptual definitions of toponym cultural heritages

Type of toponymic cultural heritage	Definition
Ancient city	The toponym and its corresponding geographical entity represent a city with a long history, which served as a regional political, economic, cultural, or transportation center
Ancient town	The toponym and its corresponding geographical entity represent a town that formed as a central settlement long ago, functioning as a regional political (or economic, cultural, transportation) center or a military stronghold
Ancient village	The toponym and its corresponding geographical entity represent a village with a long history, where traditional settlement patterns and typical architectural structures are well preserved
Ancient bridge	An ancient bridge with a long history, rich in cultural significance, and marked by notable cultural characteristics
Road, street, Road (“Lu” in Chinese) alley (lane)	A wide, straight avenue, typically flanked by shops, serving as a main traffic thoroughfare
Street (“Jie” in Chinese)	A major transportation network, characterized by distinct primary and secondary routes, intersecting and connecting with one another
Alley (“Xiang” in Chinese)	A narrow passage, primarily used for residents’ daily movement
Lane (“Li” in Chinese)	Refers to residential areas or housing districts, with “Li” and “Long” being larger
Lane (“Long” in Chinese)	and smaller in scale, respectively, typically referring to inner alleys or pathways
Lane (“Fang” in Chinese)	A basic unit of ancient city planning, typically part of a grassroots administrative organization, consisting of multiple households or residents

The notification regarding the list of Jiangsu provincial toponymic cultural heritage includes attribute data such as batch, toponym name, cultural heritage type, number of heritage sites, and administrative division location. The administrative division location refers to the administrative division to which the toponymic cultural heritage belonged in the year the list was published.

3.2 Data Processing

Using the list of toponymic cultural heritage published in the notification as the primary data, we conducted data processing and handling according to the basic framework of “standardization–spatialization–structuring”. First, historical toponyms within the toponymic cultural heritage items were selected by referencing the Jiangsu Province Standard Toponym List^[17] and the National Database for Geographical Names of China. This process was further enhanced by cross-referencing the Encyclopedic Dictionary of Ancient and Modern Chinese Geographical Names and Baidu Baike³ to identify the current toponyms corresponding to the historical toponyms, thereby standardizing the toponymic cultural heritage resources. Next, based on the National Database for Geographical Names of China, we obtained the administrative divisions and geographic coordinates of the

³ Baidu Baike. <https://baike.baidu.com/>.

toponyms to facilitate the spatialization of toponymic cultural heritage resources. Finally, we designed the content and structure for storing data related to toponymic cultural heritage resources, enabling us to structure these resources.

(1) Mapping between ancient and modern toponyms

The list of provincial toponymic cultural heritage in Jiangsu published in official notifications includes both current and historical toponyms. For historical toponyms, the numerous changes across various dynasties have resulted in discrepancies between existing toponyms and their ancient counterparts. This factor poses certain challenges for historical research, education, and the sharing of related outcomes. Therefore, it is essential to clarify the mapping relationship between historical and current toponyms. This dataset was used primarily to establish the mapping relationship between ancient and modern toponyms based on the Encyclopedic Dictionary of Ancient and Modern Chinese Geographical Names, supplemented by relevant references from Baidu Baike. The Jiangsu Province Standard Toponym List and National Database for Geographical Names of China serve as benchmarks for standard toponym references. The main processing steps for establishing the mapping relationship between ancient and modern toponyms in toponymic cultural heritage are as follows.

Step 1: If toponymic cultural heritage names not found in the standard toponym section of the Jiangsu Province Standard Toponym List also yielded no results in the National Database for Geographical Names of China, they were classified as historical toponyms. The list of historical toponyms was then sequentially searched in the Encyclopedic Dictionary of Ancient and Modern Chinese Geographical Names to identify the corresponding modern toponyms.

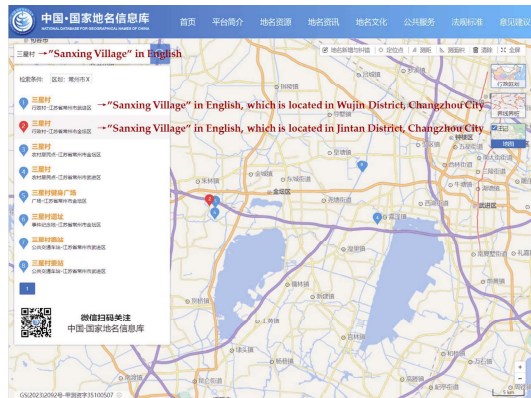
Step 2: We standardized all current toponyms (including those obtained through mapping with historical toponyms), based on the toponyms listed in the National Database for Geographical Names of China. If a current toponym could only be uniquely retrieved in the database, it was designated as the standard toponym.

Step 3: If a current toponym corresponded to multiple entries in the National Database for Geographical Names of China, the toponym was constrained according to the cultural heritage type and administrative division location as published in the notification. The names that fulfilled both criteria were selected as the standard toponyms (Figure 1). For instance, for the ancient town toponymic cultural heritage item “Shaobo”, located in Yangzhou, searching the National Database for Geographical Names of China yielded multiple names such as “Shaobo Town”, “Shaobo Bridge”, and “Shaobo Lake”, all situated within Yangzhou. However, since “Shaobo”, as an item of toponymic cultural heritage, is categorized as an ancient town, “Shaobo Town” was chosen as the standard toponym for “Shaobo”.

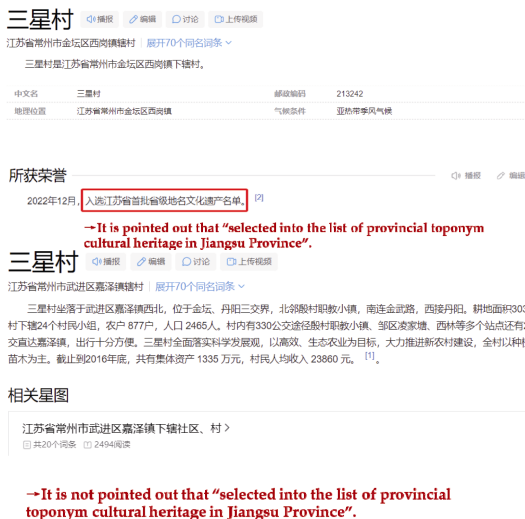
Step 4: Since the administrative division locations in the first batch of notifications were only specified at the municipal level, multiple results may remain after constraining the search results in the National Database for Geographical Names of China based on cultural heritage type and administrative division location. In this case, Baidu Baike content was referenced to determine the unique modern toponym (Figure 2). For instance, the ancient village toponymic cultural heritage “Sanxing Village”, located in Changzhou, was used to retrieve results for “Sanxing Village” in both the Wujin and Jintan



Figure 1 Toponym retrieval based on National Database for Geographical Names of China



(a) List of toponym retrieval results in the National Database for Geographical Names of China



(b) Different toponym entries in Baidu Baike

Figure 2 Analysis of toponym retrieval results based on the National Database for Geographical Names of China and Baidu Baike

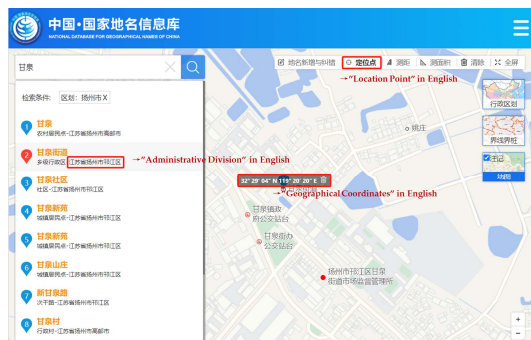


Figure 3 Acquisition of spatial location information based on the National Database for Geographical Names of China

Districts of Changzhou in the National Database for Geographical Names of China. This factor makes it challenging to determine the specific village referenced by the toponymic cultural heritage item. By consulting the Baidu Baike for basic information on each village, we identified that the “Sanxing Village” located in Jintan District was included in the first batch of toponymic cultural heritage listings as an ancient village.

(2) Acquisition of spatial location information

The geographical coordinates are not displayed in the official notification regarding the Jiangsu provincial toponymic cultural heritage list. Furthermore, the first batch of the list indicates prefecture-level administrative divisions, while the second batch indicates district-level administrative divisions, resulting in inconsistent spatial location information accuracy. Therefore, obtaining the spatial locations of Jiangsu provincial toponymic cultural heritage items involved two components: acquiring administrative division information and obtaining geographical coordinates. This dataset is based on the current toponyms of Jiangsu provincial toponymic cultural heritage after their conversion from ancient to modern names, with the National Database for Geographical Names of China used to retrieve spatial location information. For administrative division information, the relevant province-level, prefecture-level, and district-level administrative divisions can be found in the toponym search result list. Regarding geographical coordinate information, the “Locate Point” function on the map interface can be utilized to collect the coordinate points marked for the relevant toponyms (Figure 3). Specifically, the dataset obtains the unique spatial coordinate information on the corresponding toponyms for the categories of ancient cities, ancient towns, and ancient villages. We collected all available spatial coordinate information for the starting locations of the relevant toponyms under the categories of roads, streets, alleys (lanes), and ancient bridges. The

geographical spatial coordinates involved in the National Database for Geographical Names of China are represented in the 2000 National Geodetic Coordinate System (CGCS2000) and expressed in terms of their latitude and longitude.

(3) Data storage

The geographical coordinate data obtained for Jiangsu provincial toponymic cultural heritage items were then fused with administrative division data to obtain an “.shp” format data file. The attribute information such as the name, batch, and heritage type of each Jiangsu provincial toponymic cultural heritage was archived in the “.xls” format, with each field name and an example shown in Table 4.

Table 4 Attribute field dataset

Attribute	Description
Index	1, 2, 3, ..., 357
Name of toponym cultural heritage	Nanjing, Jinling, Jiankang, ...
Heritage category	Ancient City, Ancient Town, Ancient Village, ...
Batch	The First Batch, The Second Batch
Current toponym	Nanjing City, Baixia District (Withdrawn), Jianye District, ...
Provincial administrative division	Jiangsu Province
Municipal administrative division	Nanjing City, Wuxi City, Xuzhou City, ...
County administrative division	Qixia District, Jiangning District, Pukou District, ...
Pinyin	nán jīng, jīn líng, jiàn kāng, ...
Note	Former name of Nanjing, another name of Nanjing, former name of Luhe, ...

4 Data Results and Validation

4.1 Data Composition

The spatial distribution dataset of 357 items of provincial toponymic cultural heritage in Jiangsu Province consists of two parts: (1) vector data (.shp format) for the locations of provincial toponymic cultural heritage in Jiangsu Province and (2) attribute data for provincial toponymic cultural heritage in Jiangsu Province, including name, batch, type, and administrative division, stored in the .xls format.

4.2 Data Products

In terms of spatial distribution, toponymic cultural heritage is widely spread across various prefecture-level cities in Jiangsu Province. The top three cities with the highest number of toponymic cultural heritage sites are Suzhou, Nanjing, and Yangzhou, which collectively account for over 50% of the total in the province, exceeding the combined number of cultural heritage sites in the other ten cities. In contrast, the three prefecture-level cities with the fewest toponymic cultural heritage sites are Lianyungang, Suqian, and Yancheng, with eight, eight, and seven heritage sites, respectively (Figure 4).

Currently, the two published batches encompass five types of toponymic cultural heritage that are associated with administrative regions and architectural facilities, significantly influenced by human activities and urban development patterns. The Grand Canal flows from north to south through six cities in Jiangsu: Xuzhou, Huai'an, Yangzhou, Zhenjiang, Changzhou, and Suzhou. Nanjing is also connected through the Yangtze River and the canal city belt. Historically, the regions along this route were bustling with merchants, and commercial activities were frequent, particularly with the development and use of the canal for transportation, which was indispensable for this “golden waterway”. In comparison, Suqian is a prefecture-level city established in the 1990s, while Lianyungang and Yancheng are relatively distant from the densely populated areas along the Grand Canal, resulting in an inferior endowment of toponymic cultural resources.

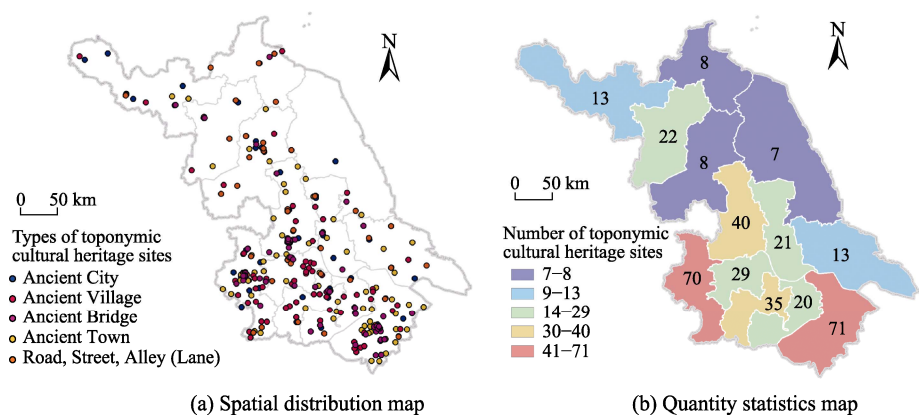


Figure 4 Spatial distribution and quantity statistics of toponymic cultural heritage in Jiangsu Province

Roads, streets, alleys (lanes) represent the largest category of toponymic cultural heritage in Jiangsu Province, accounting for 26.05%. This is followed by ancient towns (22.13%), ancient villages (19.89%), ancient bridges (17.93%), and ancient cities (14.01%). Additionally, there are significant variations in the distribution of each type of toponymic cultural heritage site across different cities. Nanjing has the highest number of ancient city toponymic cultural heritage sites, while Lianyungang does not have any sites of this type. Nanjing, Zhenjiang, and Changzhou contain relatively high numbers of ancient village toponymic cultural heritage sites, whereas Suqian, Yancheng, Lianyungang, and Nantong each have only one heritage site. Suzhou has the most ancient town toponymic cultural heritage sites, while Lianyungang again lacks any heritage sites in this category. The cities with the most sites related to roads, streets, alleys (lanes), are Nanjing, Yangzhou, and Zhenjiang, while Yancheng contains the fewest, with only two heritage sites. Suzhou leads in the number of ancient bridge toponymic cultural heritage sites, while Yancheng, Suqian, Lianyungang, Nantong, Xuzhou, and Huai'an each contain only one heritage site (Figure 5).

5 Discussion and Conclusion

Toponyms, as a part of intangible cultural heritage, constitute a significant aspect of national history and cultural heritage. Jiangsu Province has taken the lead in initiating the assessment of toponymic cultural heritage sites in the country to more comprehensively understand the spatial distribution of provincial toponymic cultural heritage, which is of great importance for the protection of toponymic culture and the continuation of historical narratives. This dataset was developed based on two batches of 357 provincial toponymic cultural heritage listings published between 2022 and 2023 while also considering the name changes and evolution that occurred over the long course of toponym development in the region. This research also established a mapping relationship between ancient and modern toponyms by referencing the Encyclopedic Dictionary of Ancient and Modern Chinese Geographical Names and utilized the National Database for Geographical Names of China to spatially process of each toponymic cultural heritage item. By analyzing the spatial distribution and quantity of toponymic cultural heritage in Jiangsu Province, we found that Suzhou, Nanjing, and Yangzhou have the most prominent endowments of toponymic cultural resources. This dataset includes detailed attribute information for 357 provincial toponymic cultural heritage, including their names, batches, heritage types, modern toponyms, and spatial information including such as geographical coordinates and administrative divisions. This dataset will provide a foundational data resource for the in-depth exploration of underlying geospatial

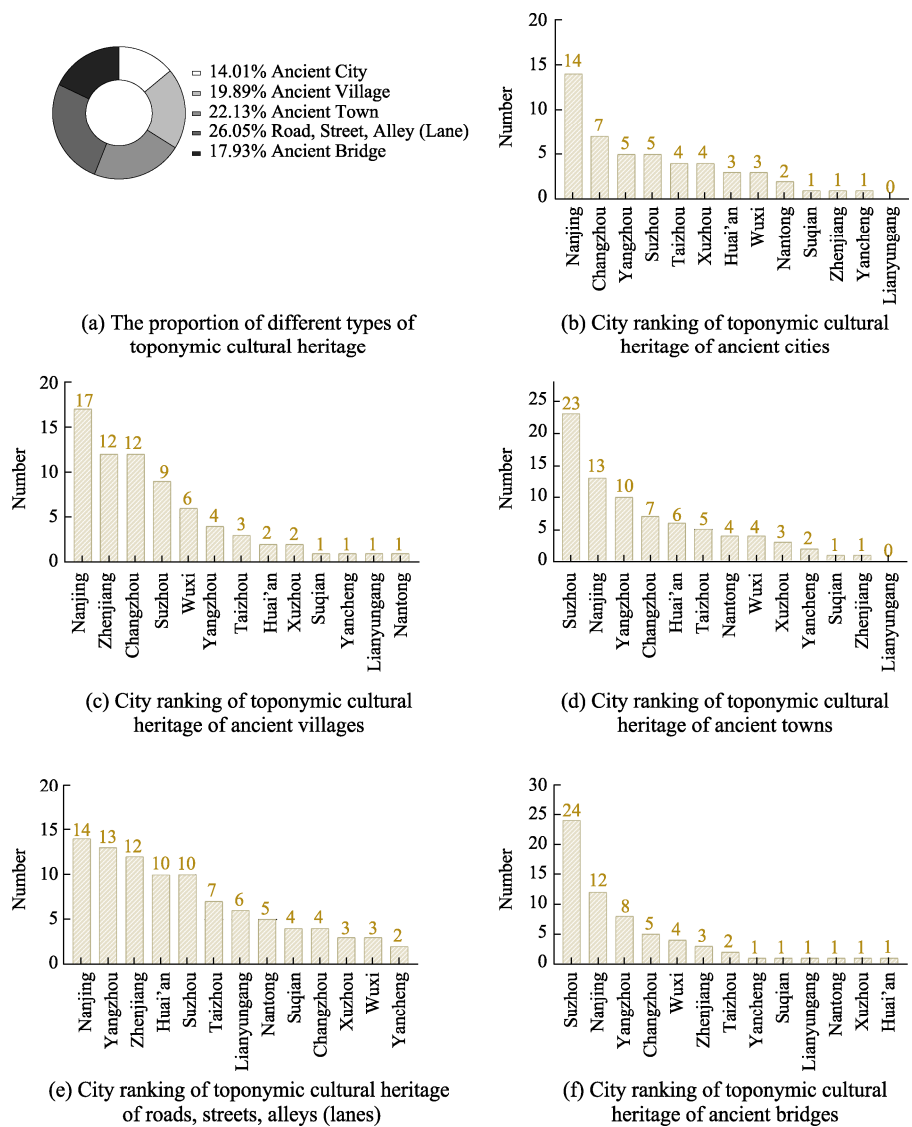


Figure 5 Quantitative statistics of different types of toponymic cultural heritage in Jiangsu Province

patterns in toponymic culture and will contribute to advancing quantitative research in the field.

Author Contributions

Liu, Y. P. and Ye, P. conducted the overall design of the dataset development; Yang, M. and He, J. collected and processed the data of provincial toponym cultural heritages in Jiangsu Province; He, H. M. conducted data verification; Ye, P. wrote the data paper; Liu, Y. P. reviewed the data paper.

Conflicts of Interest

The authors declare no conflicts of interest.

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