Relations between City Position and Water Systems--A case study of Chengdu

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ABSTRACT. The river system is not only the indispensable factor in the selection of the ancient site, but also an important reason for abandoning or urban migration. For example, the city sites of many city-states in the Western Han Dynasty the city of ancient Xinjiang are suddenly abandoned due to the diversion of the rivers, and the lack of water resources has disappeared and civilization has been destroyed.

The ancient Chinese cities have had an inseparable relationship with rivers since they were produced, many of which are distributed according to the river system, and also in their development and change, rivers are one of the most important considerations. Therefore, over the last ten years, the relationship between the selection of urban sites and rivers has attracted the attention of many geographers and urbanists at home and abroad, and the results of the research are quite fruitful. Therefore, over the last ten years, the relationship between the selection of urban sites and rivers has attracted the attention of many geographers and urbanists at home and abroad, and the results of the research are quite fruitful.He was an important architectural historian and professor at the University of California in Berkeley. I take the factors of influence of urban formation in the historical period as a starting point, he stresses: "rivers have key roles in the formation of human society they are indispensable for almost all phases of human history and are closely related to the development of human settlements".

1. Introduction

ChengDu is also called Rong or TianFuZhiGuo, which means "the City of Heaven". It is a technological, commercial, financial and transport centre in southwestern China.

Chengdu has jurisdiction over eleven municipal districts and four counties and administers five cities at county level. By the end of 2016, Chengdu had a total area of 14.312 square kilometres and a population of 15.918 million.

Chengdu is a national historical and cultural city, the starting point of the best cities in China and the South Silk Road, one of the "Ten Ancient Capitals of China". The city has more than 4500 years history and has given birth to the Dujiangyan irrigation system, the Wuhou Temple, the Du Fu Cottage of straw, the Jinsha archaeological site and many other places of interest.

2. The history of Chengdu

Chengdu is located at the intersection between the Northwest Sichuan plateau and the Sichuan basin and has its unique climate resources:

First of all, the climate of the east and west varies. Due to the difference between the east and west of Chengdu, the heat is dropping sharply with the altitude, so there are two types of climate :

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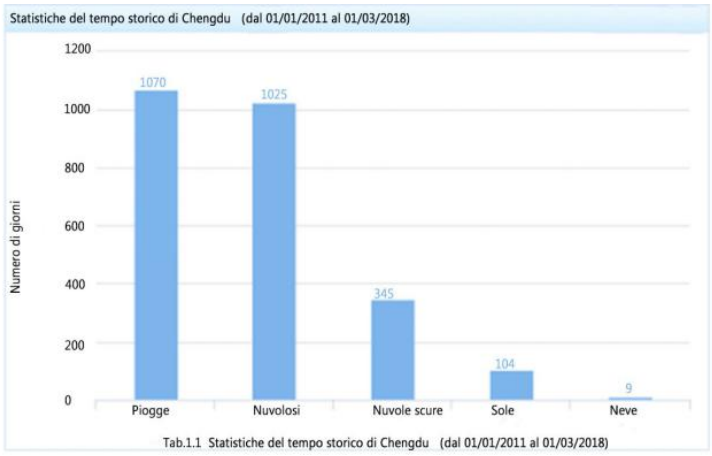
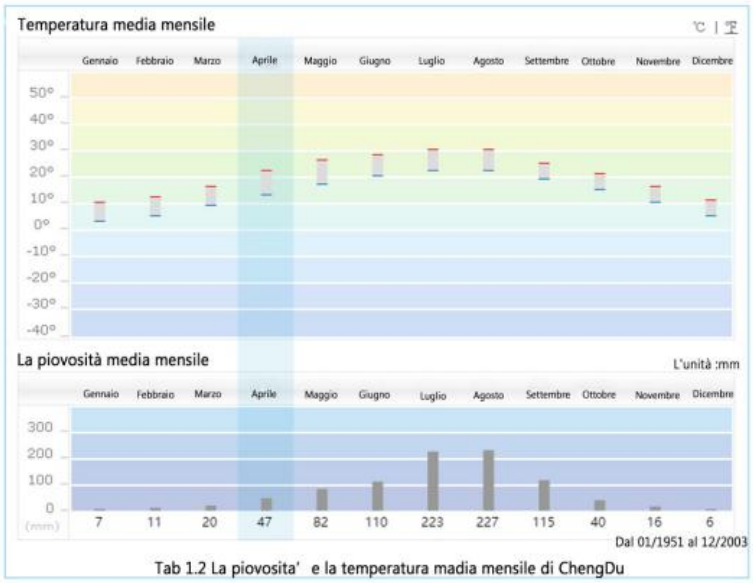
east and west, moreover, in the western basin around the mountain, from bottom to top, There are many types of climate such as subtropical climate, cold temperate climate, cool temperate climate, hot temperate climate and sub-Arctic climate. This vertical heat change has created very favourable conditions for the development of agriculture in Chengdu.

Secondly : winter is not too cold, spring comes soon, without ice period, four different seasons. The average annual temperature is about 17,5 ° C and the annual period without frost is over 337 days. The coldest month in winter (January), the average temperature is about five degrees, and the weather below ° C is very rare, the highest 2° C-3 degrees of the Yangtze central area at the same latitude.(Tab.1.1)



Tab. 1.1 Historical time statistics of Chengdu [1]

Thirdly， there is less rain in winter and spring, in summer the average annual rainfall of 1124,6 millimetres, moreover, the annual variation of rainfall is small, and the ratio between the maximum annual and minimum annual rainfall is about 2:1.(Tab.1.2)



Tab. 1.2 Rainfall and average monthly temperature of Chengdu [2]

2.2 The resources of Chengdu

Chengdu has abundant rainfall, with an average annual water resource of 30.472 billion cubic meters, including 3.158 billion cubic meters of groundwater and 18.417 billion cubic meters of transit water.

The main features: the river network has a high density. Chengdu have twelve main streams and dozens of tributaries: the rivers are vertical and horizontal, the ditches are dislocated and the density of the river networks reaches 1,22 km / km2, with the Dujiangyan Irrigation System. Second, water quality is Excellent. Chengdu is located in the upper part of the Yangtze river basin and the river consists mainly of atmospheric precipitation, underground flow and melting of snow, most indicators meet the requirements of the national secondary standard for surface waters.

Chengdu is located in a humid subtropical region with complex topography and landscape, different ecological natural environments and abundant biological resources. According to statistics, there are eleven classes, 200 families, 764 genera and over 3.000 species of animal and plant resources. Among these, there are 2682 species of seed plants, some of which are unique or rare plants including ginkgo (Ginkgo biloba L.), phoenix (Davidia involucrata Baill.), yellow heart tree (Manglietia fordiana Oliv.). and fragrant fruit trees (Emmenopterys henryi Oliv.); etc. The main 237 types of vertebrates. Rare state-protected animals include giant pandas, red pandas, golden monkeys (Rhinopithecus) and Wildebeest (Connochaetes Zimmermann). There are more than 860 types of Chinese herbal medicines.

3. Relations between the location of the city and water systems

A water network system consisting of all types of water bodies, such as rivers and lakes, in the urban water system is called a system water. The Urban water system refers to the general name of bodies of water such as rivers, lakes, ponds and artificial urban canals and urban canals that exist in or through urban areas. The urban water system is one of the most important natural geographical elements on which urban education and development are based, Urban water systems play an irreplaceable role in maintaining the normal functioning of the city or in regulating the urban ecological environment, even to some extent, determining the evolutionary direction of the urban.

3.1 Relations between the location of the city and water systems (China)

As one of the origins of Chinese civilization, Chengdu plain is in urban civilization that has spread for thousands of years． Water systems are an important natural ecological factor that goes through ChengDu history. As the ancients have described: Yi zhi you gou qu, you ren zhi you never place ye (ancient Chinese saying, that means: canal rivers, just as humans have meridians). Like the blood of the city, the river not only brings rich cultural connotations, but also creates the reputation of the "heavenly city" for the Chengdu plain. The rivers also had a profound impact on all aspects of the selection and construction of the city in the historical period.

The river system is not only the indispensable factor in the selection of the ancient site, but also an important reason for abandoning or urban migration, for example, the city sites of many city-states in the Western Han dynasty the city of ancient Xinjiang are suddenly abandoned due to the diversion of the rivers, and the lack of water resources has disappeared and civilization has been destroyed; for example, the ancient ruins of the ancient ruins of the Chengdu plain and the Sanxingdui site have been destroyed by floods the four migrations of the Xi'an site in history have been linked to the river system. Therefore, as a carrier of urban civilization, the rivers have been inextricably linked to the cities since ancient times.

The ancient Chinese cities have had an inseparable relationship with rivers since they were produced, many of which are distributed according to the river system, and also in their development and change, rivers are one of the important considerations. Therefore, over the last ten years, the relationship between the selection of urban sites and rivers has attracted the attention of many geographers and urbanists at home and abroad, and the results of the research are quite fruitful. He was an important architectural historian and professor at the University of California in Berkeley. I take the factors of influence of urban formation in the historical period as a starting point, he stresses: "rivers have key roles in the formation of human society, they are indispensable for almost all phases of human history and are closely related to the development of human settlements". In the history of the world, most cities around the world tend to be built near or near rivers, such as river junctions, narrow curves, peaks on the river tops or estuaries.

Until the construction of the Dujiangyan irrigation system, the Chengdu plain——where "When the river is flooded, the people of Chengdu become fish"—— gradually became "the paradise city" where "Flood or drought are subject to human command". In this process, the Dujiangyan irrigation system has been continuously modified to form a channel system consisting of "gan, zhi, dou, nong and mao" (Division of channel systems in ancient Chinese water conservation projects). Even the living environment of the Chengdu plain has undergone important changes and the location of its cities and villages has evolved from "waterproof" to "near the water".

3.2 The shape of Chengdu's water system

The Chengdu plain consists mainly of the Mianyang River, the Minjiang River, the Shiting River, the Lancang River, the Xihe River and the Nanhe River. The swamps are densely covered throughout the plain and the aquatic environment is worrying. The ancients described the scenes of life in ancient Chengdu "The river waves and people are fish." In such a harsh living environment, the ancient ancestors actively reformed the environment for production and life. After a series of water control activities such as Du Yu and Li Bing (Who built the Dujiangyan irrigation system), Chengdu Plain's overall living environment has been significantly improved, some rivers are unlocked and the water system of Chengdu plain is emerging, major rivers are disorderly radial and the inflows are very disorderly. (Fig 2.)

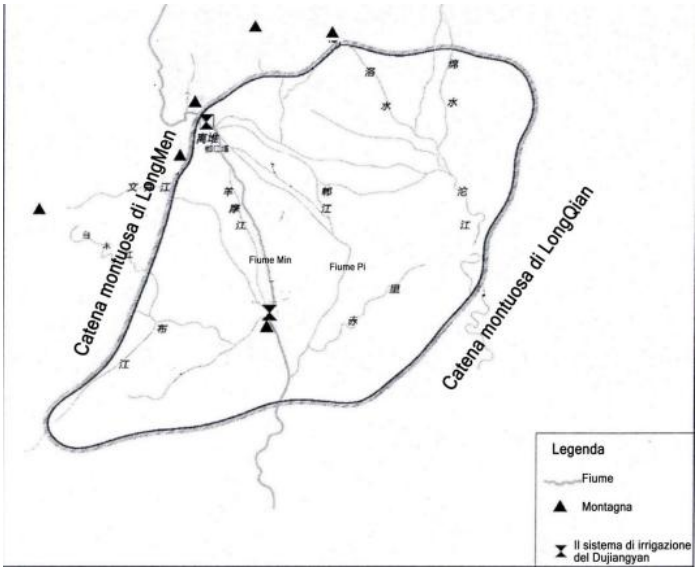


Fig. 2 The Chengdu plain during 453a.C.-221 a.C

During the Yuan, Ming and Qing dynasties (1271 d.C.-1912 d.C.), the inner and outer river basins of the Chengdu plain were stable and the eight main canal structures had matured and the general water system of the Chengdu plain began to develop in a similar direction to a network. (Fig 3.)

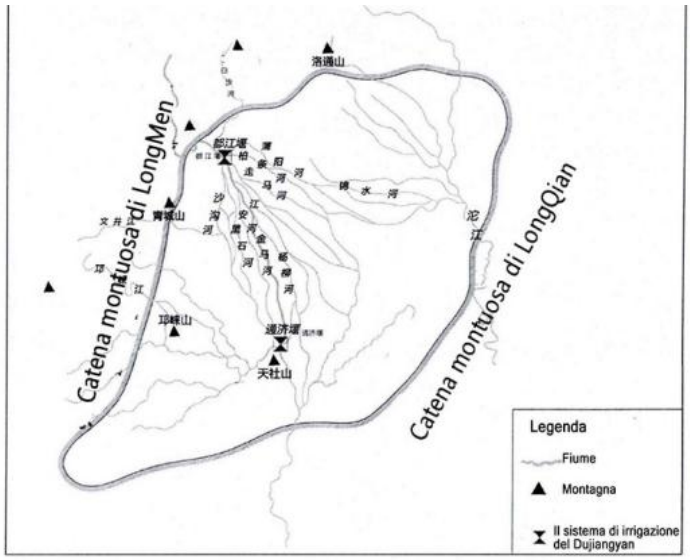


Fig. 3 The Chengdu plain during 581 1271 d.C.-1912 d.C.

3.3 Changes of the city

We can see that from the historical period, the position of the cities of Chengdu is inseparable from the development of the water systems. The transfer and expansion of cities vary depending on changes in the water system[3]. (Fig 5.)

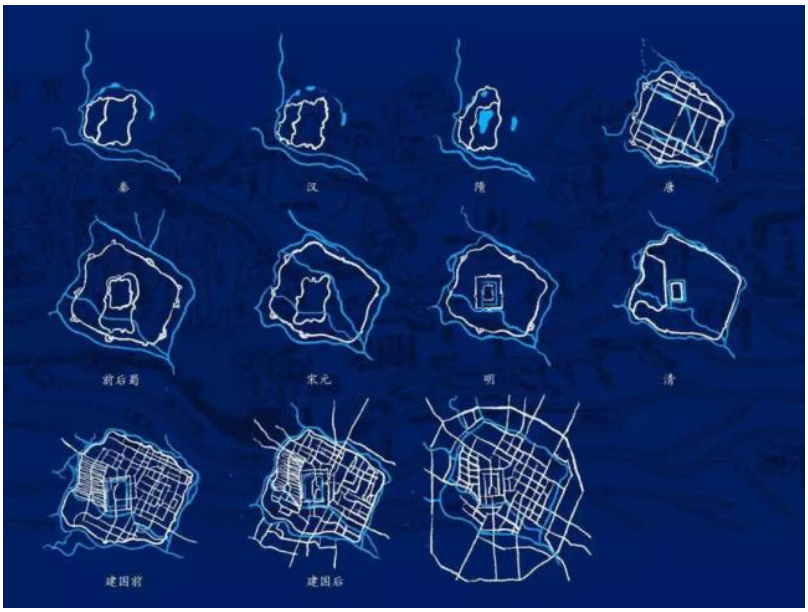


Fig. 5 Changes in the city of ChengDu

As a foundation for the development of Chengdu city plains, water has cultivated its only water culture, and has also received a rich historical impression. Especially the construction of the Dujiangyan irrigation system, Chengdu has constituted a unique concept of water management, at the same time maximizes its water control by thinking of "taking advantage of the situation and adapting to the times".

The "water culture" of the Chengdu plain has a long history and a wide influence: most cities in the historical period were built according to water, most of the names are linked to water. Chengdu is paying more attention to the ingenious use of water systems in urban construction, combining these natura l forms with urban space and pursuing the harmonious development of man and nature -i.e., the idea of "the combination of sky and man" in these ancient Chinese so build a space history and culture of the unique memory, forming a unique city in Western Sichuan.

4. Conclusion

In the composition of the system, although the Chengdu plain was repeatedly divided into administrative units, it formed a number of county guards, but also does not alter the importance of Chengdu city in the plain, with a high urban primacy index. Secondary cities are all run by floods and most secondary cities are located at the intersection of the floods. The tertiary cities formed the third level of the system, with a large number of specimens, the weed market(Market originated from the Song dynasty. Because the houses of the market are covered by grass or the main market is a market to buy and sell grass, so the grass market is called. is its original prototype, and is developed relying on the ferry of the river traffic, and is formed with the stability of the channel. The tertiary cities are mostly located in the flat dam formed by the flood channel, and the cities are more distributed by the branch of the canals. Forest cities are the lowest level in the system and the numbers are more than any other city, it can be said that the waters of the river have made a distinct and unique settlement of forest cities in the Chengdu plain. (Fig 6.)

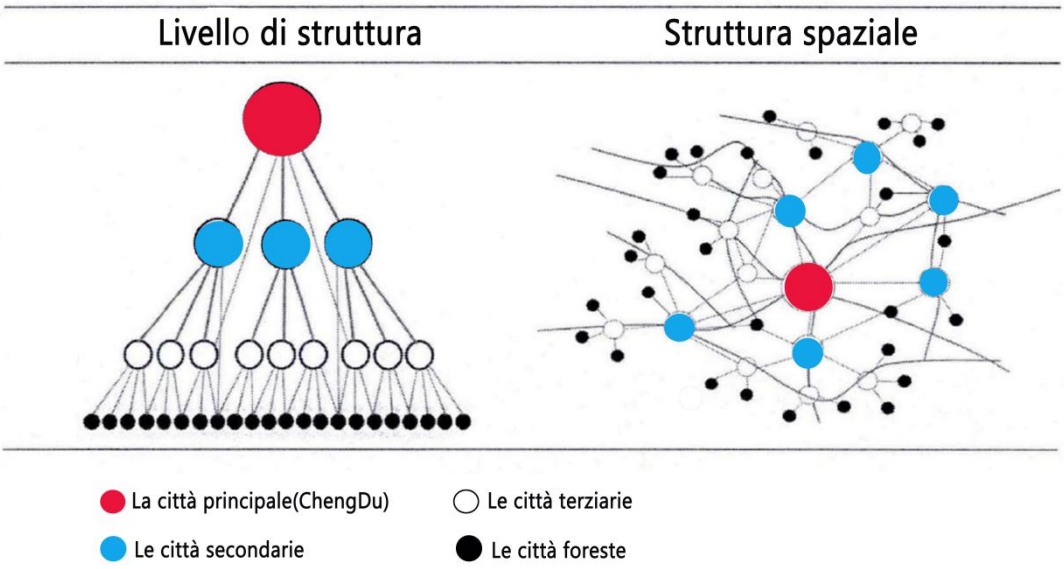


Fig. 6 The system structure of the ChengDu

the combination of system space, Chengdu cities present the characteristics of the next and higher level as a centerpiece or collection centre, forming a network of the urban space system. In other words, the central city is the core, and secondary cities are the relatively uniform urban

structure of the nodes. The connection between them is mainly based on rivers and watercourses in the historical period, as in the main distribution corridor series inside.

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