

# A Study on the Natural Geographical Laws of Epidemic Disasters in Western Fujian in Ming Dynasty

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## ABSTRACT

This paper studies the epidemic situation in Western Fujian area in Ming Dynasty, studies, analyzes and summarizes the causes and consequences of epidemic in Western Fujian area, and focuses on the close relationship between flood, drought and epidemic caused by climate, so as to fill the gap in the research of epidemic in Western Fujian area and provide reference for modern epidemic prevention.

**Keywords:** *Ming Dynasty, Western Fujian, epidemic, epidemic prevention*

## 1. INTRODUCTION

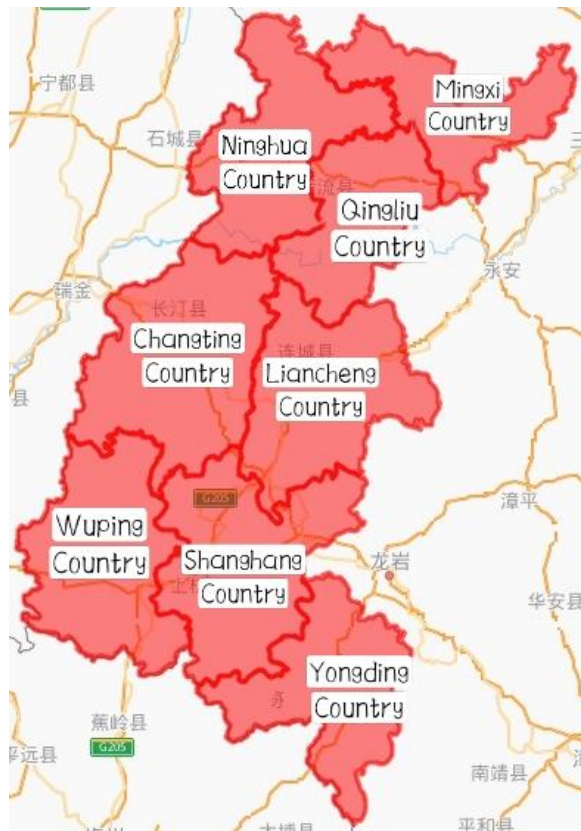
"A plague is a disaster caused by an epidemic [1]." Different from other natural disasters, epidemic disasters often take thousands or even millions of people's lives because of their complex causes, great harm and trouble to deal with. China has been affected by epidemic since ancient times, with an average of one epidemic every four years [1]. This paper chooses Ming Dynasty as the research time. At the end of the Yuan Dynasty, the plague was rampant and the people were in dire straits. Zhu Yuanzhang took advantage of the situation and started the Ming Dynasty in 1368, with Yingtian as his capital. Chongzhen at the end of Ming Dynasty was also a plague. There were starving people in the wild. In 1644, the Qing army entered the pass and the Ming Dynasty was destroyed. It can be seen that the Ming Dynasty, as the last feudal dynasty established by the Han nationality in ancient Chinese history, was inextricably linked with the plague from existence to nonexistence. The research space selected in this paper is western Fujian. There are many researches on epidemic disasters in Fujian. For example, Zhang Yiliu analyzed the temporal and spatial distribution of epidemic disasters in Fujian Province in detail in his paper "Research on the geographical laws and environmental mechanism of epidemic disasters in Fujian Province in Ming Dynasty", so as to elaborate the

close relationship between the changes of epidemic disasters and climate, environment and natural disasters[2]; Lin tingshui listed the epidemic data of Fujian in Ming and Qing Dynasties in detail in the epidemic of Fujian in Ming and Qing Dynasties[3]; Li Ying also came to the same conclusion in the treatise on Fujian pestilence in Ming Dynasty: "Fujian was a pestilence prone area in Ming Dynasty... There were 163 pestilences in counties"[4]; Xiong Yiliang[5] expounded the influence of the epidemic in Northern Fujian on the medical circles in the perspective of traditional Chinese medicine; Zeng Yiling [6] analyzed the epidemic disasters in Southern Fujian during the Ming and Qing Dynasties. However, it is a pity that most scholars only mentioned one or two about Western Fujian when they talked about Fujian Province, and almost no one specially studied and analyzed it. There are two reasons why this paper chooses to study the epidemic disasters in Western Fujian. First, after consulting the data, it is found that there are few case studies on the epidemic disasters in Western Fujian in Ming Dynasty, and the research space is extensive; Second, because I grew up in the Western Fujian since childhood, I am familiar with the unique local conditions and customs of West Fujian. There are two innovations. First, compared with other regions in Fujian Province, there are fewer epidemic disasters in Western Fujian, so there are few mention in official books such as official history. Therefore, this paper mainly refers to the local

chronicles of eight counties in Western Fujian; Second, this paper chooses a long research time line, based on the Ming Dynasty 276 years.

**2. THE GENERAL SITUATION OF WESTERN FUJIAN AND THE TEMPORAL AND SPATIAL DISTRIBUTION OF EPIDEMIC DISASTER**

Fujian is located in the southeast coast of China, and the Western Fujian is located in the west of Fujian Province. As shown in the figure below, Western Fujian is composed of eight counties: Mingxi County (Guihua county), Ninghua County and Qingliu County in Sanming City, Changting County, Liancheng County, Shanghang County, Wuping County and Yongding County in Longyan city.



Referring to the meteorological records of the Ming Dynasty in the collection of meteorological records of China for three thousand years [7] written by Mr. Zhang de'er, a list of epidemic situation in Western Fujian area in Ming Dynasty is made.

Table 1. Epidemic situation in Western Fujian area in Ming Dynasty

Time	The 7th year of Zhengde(1512)	The 16th year of Zhengde(1521)
Disaster area	Wuping County	Ninghua County

Time	The 23rd year of Jiajing(1544)	The 40th year of Jiajing(1561)
Disaster area	Changting County Liancheng County Qingliu County Ninghua County	Liancheng Count Guihua County
Time	The 12th year of Wanli(1584)	The 29th year of Wanli(1601)
Disaster area	Liancheng County	Liancheng County
Time	The 31st year of Wanli(1603)	The 6th year of Tianqi (1626)
Disaster area	Ninghua County	Liancheng County

It can be seen from the above that there were 8 years of epidemic disasters in Western Fujian area in Ming Dynasty. During the 48 years of the Wanli Dynasty (1573-1620), epidemic disasters occurred in the Western Fujian in 3 years, with the highest frequency; During the 16 years of the Zhengde Dynasty (1506-1521) and the 45 years of the Jiajing Dynasty (1522-1566), 2 epidemic disasters occurred in Western Fujian; During the 7 years of Tianqi Dynasty (1621-1627), only 1 year of epidemic occurred in Western Fujian; Among the 8 counties in Western Fujian, Liancheng County had 5 epidemic disasters, the most frequent; There were 3 epidemic disasters in Ninghua County, and the number was the second; Only 1 epidemic occurred in Changting County, Wuping County, Guihua County and Qingliu County; No epidemic occurred in Shanghang County and Yongding Country.

From the time point of view, the epidemic disasters in Western Fujian were concentrated in the middle and late Ming Dynasty, with high incidence in autumn and winter and a little less in spring and summer. From the perspective of space, only in the 23rd year of Jiajing (1544), the epidemic affected the most widely, involving Ninghua County, Liancheng County, Changting County and Qingliu County. In other years, the epidemic occurred in one county.

**3. NATURAL TOPOGRAPHY, HYDROLOGICAL CHARACTERISTICS, CLIMATE CHARACTERISTICS AND EPIDEMIC DISASTERS**

As Professor Gong Shengsheng and others have concluded: "Geographical conditions provide a suitable environment for the growth and reproduction of pathogens; Natural disasters are catalysts, which provide conditions for the occurrence and spread of epidemic

diseases [8]." The natural environment and climate disasters promote the emergence of epidemic disasters, but the spread of epidemic disasters is limited by the physical and geographical characteristics to a certain extent. The Western Fujian region is a good example. The terrain of Western Fujian is complex, mainly mountainous and hilly, with high terrain in the northeast, low terrain in the West and low terrain in the south. In the territory, there are many peaks and hills. According to the records of traffic records in Western Fujian, "Most of the ancient roads in West Fujian are located in cliffs and valleys or near streams; Because of the disrepair of the past dynasties, there are many dangers.....In the middle of Han Dynasty, Ying, king of Minyue, repeatedly invaded Donggou (now Wenzhou) and Dongyue (now Guangdong and Guangxi) in neighboring areas. Emperor Wu of Han Dynasty wanted to send troops to fight against it. Liu Ning, king of Runan, wrote a letter to admonish him: "I heard that there is no city in Minyue, and the residents live in valleys and bamboo forests, where the land is deep and dangerous, and it is very difficult to March.....[9]" It can be seen that the traffic in Western Fujian was very inconvenient at that time. "The greater the population density, the stronger the mobility of population and the higher the accessibility of transportation, the easier it is to induce epidemic. Population as the source of infection and susceptible population is fundamental, and transportation conditions are the accelerator of epidemic [8]. " The slow development of the transportation system in Western Fujian has restricted the large-scale population flow and hindered the spread of the epidemic to a certain extent.

Therefore, throughout the epidemic disasters in Western Fujian in the Ming Dynasty, only the epidemic disasters in the 23rd year of Jiaping (1544) affected a wide range, involving Ninghua County, Liancheng County, Changting County and Qingliu County. The epidemic disasters in other years were limited to one county.

The second is hydrological characteristics. One side of the soil and water nourishes one side of the people, and the river has brought rich resources to mankind. Cities are built along the river, and people are born along the river, as is the case in Western Fujian. There are many streams and rivers in Western Fujian, with Ting River as the leader. "There are many tributaries of the Ting River, with the drainage area of more than 500 square kilometers including Zhuotian River, Taolan River, Jiuxian River, Huangtan River, Yongding River and Jinfeng River [10]. " Because of the complex terrain, most of the cities in Western Fujian are built on both banks of rivers or at the confluence of rivers, with low terrain and poor drainage. In case of rainstorm caused by climate change, they are vulnerable to floods. The relationship between rainstorm, flood and epidemic will be discussed in detail below.

Finally, the relationship between climate characteristics and epidemic disaster is discussed." There is a correlation between natural disasters and epidemic disasters. Although natural disasters can not directly lead to plague, they can change the habitat of pathogens, cause large-scale reproduction of pathogens in a short time, weaken the resistance of the affected people, and indirectly induce the epidemic of plague [1]. " Climate change is easy to cause natural disasters. Among all kinds of natural disasters, the most serious one in Western Fujian in Ming Dynasty was flood.

Flood refers to the disaster caused by long-term rain, flash floods, river flooding and other reasons. It can be said that precipitation is the main cause of floods. The precipitation in Fujian is affected by both monsoon activity and geographical factors, so the temporal distribution of precipitation is very uneven. Among them, may and June are the rainy periods of the whole year, with the total rainfall of 400-700 mm, accounting for 34-37% of the total rainfall of the whole year; October to February of the next year is the dry period of the whole year. The total rainfall in all parts of the province is only 160-400mm, accounting for 15-20% of the total rainfall of the whole year [11].

To sum up, the flood in Western Fujian is caused by two factors. First, the climate leads to the concentration of precipitation in spring and summer in Western Fujian; Second, because of the complex terrain, most of the cities in Western Fujian are built on both sides of rivers or at the confluence of rivers, with low and flat terrain and poor drainage.

The disaster brought by the flood to the people is huge. For example, in the 21st year of Chenghua, Tingzhou "Had heavy rain in summer, and the mountains and rivers overflowed suddenly... Most of the houses in the seven counties were damaged, the houses near the stream were damaged seriously, and many people and animals drowned. [12]" On April 23, the 33rd year of Jiaping, Qingliu County " The flood inundated many fields and houses. Many people and animals drowned. [13] " In addition, the flood also created conditions for the occurrence of epidemic. As far as the source of infection is concerned, after the flood, "the dead lie on their backs. [14]", if the corpses of the people who died in the disaster are not properly handled in time, the weather is hot and humid, and it is easy to breed bacteria and viruses. After the disaster, food shortage, water pollution, people's diet can not guarantee health. Most of the cities in Western Fujian are built along the river, so the flood in Western Fujian has a wide range. For example, in the second year of Chenghua, floods suddenly occurred in Changting County, Ninghua County, Qingliu County, Guihua County, Liancheng County and Yongchun County, resulting in drowning of people and animals [15]. In the 35th year of Jiaping, floods occurred in Qingliu County,

Ninghua County, Shanghang County and Liancheng County[16]. Several connected cities were affected together, which also created a way for the large-scale spread of the epidemic. Finally, the disaster led to the displacement of people, the decline of physical fitness, and the invasion of diseases.

Too much rain, easy to form floods, too little rain, easy to cause drought. Like floods, drought is closely related to precipitation. Due to the uneven distribution of precipitation time, the rainfall from October to February next year is only 20%, and the northeast monsoon prevails from November to February next year. As for drought, the records in historical books are relatively short, mostly in the words of "Drought" and "Great drought", such as "Great drought" in the 21st year of Wanli, Liancheng County[17]. But its huge impact can not be ignored. "After the drought, the villagers were in great difficulty. [18] "After the drought, grain production decreased significantly and the supply was insufficient. For example, in the ninth year of Xuande, Liancheng County wrote to the emperor that "last summer there was a drought, and there was no harvest in the fields and valleys, and the people had nothing to eat[19]." Food shortages have led to soaring food prices. For example, in the eighth year of Chongzhen, the price of rice in Qingliu County was two cents per bucket. The poor people join the county government and rob the rich people of their rice[20]. Food is scarce and expensive, which can easily lead to famine. For example, in the ninth year of Jiajing, "on the second day of September, drought caused famine in Changting, Wuping and Ninghua counties[21-23]." Under the dual effects of drought and famine, the epidemic followed. Because of drought and famine, the victims have to leave their hometown to seek a way to live. The food and lodging conditions are poor. In order to fight against hunger, the victims will eat the roots of wild grass to satisfy their hunger. Long term consumption will lead to malnutrition, the physical quality of the victims will decline, and the epidemic will take advantage of it. Such as Zhengde 7th year, Wuping County "Epidemic and hunger[24]." In the 16th year of Zhengde, Ninghua County "Great hunger and epidemic[25]." All of them showed the close relationship between drought and famine and epidemic.

#### 4. CONCLUSION

From the perspective of nature, this paper analyzes the relationship between the natural topography, hydrological characteristics and climatic characteristics of Western Fujian and the epidemic disaster, and mainly discusses the direct or indirect relationship between the flood and drought caused by the climatic characteristics and the epidemic disaster in Western Fujian.

First of all, in the 276 year history of the Ming Dynasty, epidemic disasters occurred in Western Fujian

for 8 years, mostly in autumn and winter in the middle and late Ming Dynasty. In the Wanli Dynasty, epidemic disasters occurred in Western Fujian for 3 years, with the largest number of times and small scope. Secondly, the complex terrain of Western Fujian makes the traffic very inconvenient, which limits the large-scale population flow and indirectly hinders the spread of the epidemic. Finally, the two disaster chains of "rainstorm flood epidemic" and "drought famine epidemic" are analyzed. The flood in Western Fujian is caused by two factors, one is that the cities in Western Fujian are along the river, the other is that the time distribution of precipitation in Western Fujian is uneven. Drought is also caused by uneven time distribution of precipitation. After drought, food supply falls short of demand, leading to famine. After the floods and droughts, the dirty, disorderly and poor food and accommodation environment led to the decline of people's physical quality. The dead people's bodies were not properly handled, which led to the breeding of bacteria and viruses. A variety of factors led to the epidemic.

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