

Discussion on the Application of Statistical Analysis Method in Geography Education Research — Taking Drought and Snow Disaster in Xilingol League as an Example

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ABSTRACT

Based on the statistical analysis method, this paper studies the temporal and spatial correlation between drought and snow disasters and El Nino/La Nina events in various counties of Xilingol League. According to the research results, it is found that the number of disasters in Xilingol League in El Nino/La Nina year accounts for 54% of the total number of disasters in Xilingol League. El Nino has more disasters than La Nina. In El Nino/La Nina years, the frequency of snow disasters in Xilingol League is higher than that of drought disasters. The areas with high frequency of El Nino disasters are East Ujimqin Banner, West Ujimqin Banner and Abaga Banner. The areas with high frequency of disasters in La Nina are Sonid Zuoqi, Er-enhot, Xilinhote and Xianghuang Banner. Using statistical analysis method can accurately and effectively study whether there is obvious correlation between drought and snow disasters and El Nino/La Nina events in Xilingol League, and enrich the methods and contents in geography education and research, which is of great significance for monitoring and preventing drought and snow disasters in Xilingol League.

1. Research Background

Under the background of global warming and climate evolution, El Nino/La Nina events often occur ^[1]. Historically, El Nino refers to a large-scale ocean anomaly that occurs every 3-7 years, that is, around Christmas, a weak warm ocean current appeared along the coast of El Guador and Peru, which replaced the usual cold water ^[2]. When this phenomenon occurred, the whole equatorial eastern Pacific showed warming with amplitude of several

degrees Celsius ^[3]. When the sea surface temperature in the equatorial central and eastern Pacific Ocean is higher than 0.5 degrees Celsius for more than half a year, it is called an El Nino event, also known as a “warm event”. La Nina phenomenon refers to the abnormal drop of water temperature in the equatorial central and eastern Pacific Ocean, which is characterized by obvious cooling in the central and eastern Pacific Ocean, and is also called “anti-El Nino” or “cold event” ^[4]. When the sea surface temperature in the equatorial central and eastern Pacific

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Ocean lasts for more than half a year and the temperature is 0.5 degrees Celsius lower, it is called a La Nina event. Cold events have a much smaller impact than warm events, but once they happen, they will bring great troubles and troubles to nature and human beings^[5].

The grassland in Xilingol League is widely distributed and the ecological environment is fragile^[6-7]. Drought and snow disaster are the main meteorological disasters in local agriculture and animal husbandry. Extreme events such as El Nino/La Nina will affect atmospheric circulation, thus affecting precipitation and temperature, causing climate anomalies and natural disasters. In recent years, many scholars have studied the impact of El Nino/La Nina events on natural disasters. Zhang Xiuwei and Zhao Jingbo^[8] studied the influence of El Nino/La Nina events on the climate in the eastern margin of Ordos Plateau in recent 57 years, and concluded that drought is easy to occur in ENSO warm events in this area. The ENSO cold event has a significant impact on the climate in Harbin, which makes the climate in this area develop towards warming and drying. Cold events will increase the possibility of drought in Harbin.

Based on the statistical analysis method, this paper studies the spatial and temporal characteristics and laws of drought and snow disasters in Xilingol League under the influence of El Nino/La Nina events, enriches the methodology and practical requirements in geography education and curriculum, and can also monitor and predict drought and snow disasters in grassland and pastoral areas of Xilingol League, thus minimizing disaster losses in Xilingol League.

2. Data Sources and Research Methods

2.1 Data Sources

This paper takes 12 counties in Xilingol League as examples, and makes an empirical analysis of statistical analysis in geography education research. This paper studies the statistical data of drought and snow disaster in Xilingol from 1968 to 2016, and analyzes and studies the relevant statistical data of El Nino-La Nina event, and discusses the suitability and feasibility of statistical analysis method in geographical application.

2.2 Research Methods

In this paper, the spatial-temporal relationship between drought and snow disasters and El Nino/La Nina events in Xilingol League is studied by statistical methods, and the spatial distribution characteristics of natural disasters and extreme events in all counties of Xilingol League are analyzed.

3. Results and Analysis

Based on the statistical data of drought and snow disasters in Xilingol from 1968 to 2016, this paper analyzes the spatial distribution characteristics of drought and snow disasters in Xilingol League in El Nino-La Nina years. According to Table 1, according to the drought situation, the areas with more droughts in each flag county in El Nino year are Sonid Zuoqi and Sonid Youqi located in the western part of Xilingol League. Judging from the snow disaster situation, the areas with more snow disasters in each flag county in El Nino year are East Ujimqin Banner and West Ujimqin Banner located in the northeast of Xilingol League. There is Abaga Banner in the north-central part of Xilingol. Generally speaking, the areas with high frequency of El Nino disasters are the eastern part of Xilingol League, such as East Ujimqin Banner and West Ujimqin Banner, and the central part of Abaga Banner. In El Nino, the total number of snow disasters in Xilingol area is greater than the total number of droughts. The areas where the frequency of snow disaster is greater than that of drought in El Nino are East Ujimqin Banner, West Ujimqin Banner, Abaga Banner, Duolun County and Xianghuang Banner. The areas where the frequency of drought is greater than that of snow disaster in El Nino are Sonid Youqi, Erlianhot, Xilinhot, Zhenglan Banner and Taibus Banner.

According to Table 2, according to the drought situation, the areas with more droughts in all flag counties in La Nina year are Xilinhot City, Xianghuang Banner and Sonid Zuoqi in the central and western part of Xilingol. Judging from the snow disaster situation, the areas where snow disasters occurred most frequently in all flag counties in La Nina are Erlianhot City, Xilinhot City and Zhenglan Banner located in the central and western part of Xilingol. Generally speaking, the areas with high frequency of disasters in La Nina are the western part of Xilingol League, such as Sonid Zuoqi and Erlianhot City, and the central part of Xilinhot City and Xianghuang Banner. The total number of snow disasters in La Nina is greater than the total number of droughts. The areas where snow disasters occur more frequently than drought disasters in La Nina are East Ujimqin Banner, West Ujimqin Banner, Abaga Banner, Xilinhot City, Zhengxiangbai Banner, Zhenglan Banner and Sonid Youqi. The areas where the frequency of drought in La Nina is greater than that of snow disaster are Sonid Zuoqi, Zhenglan Banner and Taibus Banner.

Combined with Table 1 and Table 2, it can be known that the number of droughts and snow disasters in El Nino is greater than that in La Nina. The frequency of drought

Table 1. drought and snow disaster in Xilingol League in El Nino year

| County name | drought | snowstorm | total |
|----------------------|---------|-----------|-------|
| East Ujimqin Banner | 2 | 8 | 10 |
| West Ujimqin Banner | 3 | 7 | 10 |
| Abaga Banner | 2 | 8 | 11 |
| Xilinhot | 2 | 1 | 3 |
| Zhenglan Banner | 4 | 3 | 7 |
| Zhengxiangbai Banner | 2 | 2 | 4 |
| Xianghuang Banner | 4 | 5 | 9 |
| Duolun County | 1 | 2 | 3 |
| Taibus Banner | 3 | 2 | 5 |
| Sonid Zuoqi | 5 | 5 | 10 |
| Sonid Youqi | 6 | 2 | 8 |
| Erlianhot | 1 | 0 | 1 |
| total | 35 | 45 | 80 |

Table 2. drought and snow disasters in Xilingol League in La Nina

| County name | drought | snowstorm | total |
|----------------------|---------|-----------|-------|
| East Ujimqin Banner | 0 | 1 | 1 |
| West Ujimqin Banner | 1 | 4 | 4 |
| Abaga Banner | 1 | 4 | 5 |
| Xilinhot | 1 | 2 | 3 |
| Zhenglan Banner | 0 | 4 | 4 |
| Zhengxiangbai Banner | 1 | 3 | 4 |
| Xianghuang Banner | 3 | 2 | 5 |
| Duolun County | 0 | 0 | 0 |
| Taibus Banner | 1 | 0 | 1 |
| Sonid Zuoqi | 4 | 3 | 7 |
| Sonid Youqi | 0 | 3 | 3 |
| Erlianhot | 0 | 1 | 1 |
| total | 12 | 27 | 39 |

in all flag counties of Xilingol League in El Nino is greater than that in La Nina. Except Sonid Youqi and Erlianhot in the west of Xilingol League, Zhengxiangbai Banner, Zhenglan Banner and Xilinhote in the middle of Xilingol League, the occurrence frequency of snow disaster in El Nino year is greater than that in La Nina year.

4. Conclusion

In this paper, the statistical data of 221 drought and snow disasters, 21 El Nino events and 11 La Nina events in 12 flag counties of Xilingol League from 1968 to 2016 were collected and collated, and the spatial-temporal coupling relationship between drought and snow disasters and El Nino/La Nina events in each flag county of Xilingol League was studied by statistical analysis method. According to the research results, it can be known that Xilingol League has more disasters in El Nino than in La Nina. In El Nino/La Nina years, the frequency of snow disasters in Xilingol League is higher than that of drought disasters. The areas with high frequency of El Nino disasters are East Ujimqin Banner, West Ujimqin Banner and Abaga Banner. The areas with high frequency of disasters in La Nina are Sonid Zuoqi, Erenhot, Xilinhote and Xianghuang Banner. In the El Nino/La Nina year, the spatial characteristics of drought and snow disasters in the flag counties of Xilingol are different. The research results have obvious regularity: drought and snow disasters in Xilingol League have obvious correlation with El Nino/La Nina events in time and space, which shows that the application of statistical analysis method in geography education research is appropriate and correct. It enriches the methodology and curriculum system of geography education research.

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