

Discussion on geological disaster prevention and control measures

--Taking the Geological Survey of Hanyin County as an example

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Abstract

Geological disasters are one of the main natural factors that cause major social and economic losses in our country. This article analyzes in detail the geological disasters caused by human factors, such as cutting slopes to build houses, man-made hidden hazards, slope reclamation, destruction of vegetation, induced landslides, and engineering construction. Destroy slope stability, mining and quarrying, digging hills and cutting slopes, and randomly stacking and discarding slag. At the same time, it puts forward the policy of combining protection and utilization, attaches great importance to geological environmental protection and geological disaster prevention and control planning, strengthens geological environment monitoring and data accumulation, continues to attach importance to the education of geological disaster prevention knowledge and the improvement of the mass monitoring and prevention network system, and the establishment of high efficiency Environmental protection and geological disaster prevention measures, such as the geological disaster information system of the People's Republic of China, are expected to provide a reference for the comprehensive geological disaster prevention and control work.

Keywords

Geological hazards; geological survey; prevention and control measures.

1. Introduction

Geological disasters are one of the main natural factors that cause major social and economic losses in our country. The prevention and control of geological disasters has been carried out to a certain extent in various districts and counties of our country, and some achievements have been made. However, the geological disasters and impacts caused by various districts and counties have their own characteristics^[1-3]. In accordance with the requirements of the Regulations on Prevention and Control of Geological Disasters, the Decision of the State Council on Strengthening the Prevention and Control of Geological Disasters, and the "Twelfth Five-Year Plan for the Prevention and Control of Geological Disasters in Shaanxi Province", on the basis of the investigation and zoning of geological disasters, serious geological disasters have Field surveys of geological disasters such as landslides, avalanches, debris flows, and ground subsidences in counties (districts) can survey and map important disaster points and improve the accuracy of the survey. This article takes the geological survey of Hanyin County as an example to fully find out landslides, collapses, and debris flows. The rock and soil conditions of the disaster occurred, clarified its development, distribution law and formation mechanism. At the same time, it analyzed the general situation of man-made geological disasters in Hanyin County, and put forward effective measures for environmental protection and geological

disaster prevention in Hanyin County. Provide reference for the comprehensive prevention and control of geological disasters.

2. Overview of the study area

Hanyin County is located in the middle of the mountainous area of southern Shaanxi, bordering the Qinling Mountains in the north and Bashan in the south. The terrain is "three mountains and two rivers". The "three mountains" are "Qinling, Fenghuangshan, and Bashan", and the "two rivers" are "Yuehe and Hanjiang". Phoenix Mountain is an east-west mountain range that divides Hanyin County into north and south. Fenghuang Mountain is about 2000 m above sea level. Tiewa Temple in Pingliang Town is the highest point in the county, with an elevation of 2128.3 m. Yuehe Basin's elevation is 290-500 m. Ruzhen Yuehe River Beach is the lowest point in the county, with an elevation of 290 m. Hanyin County is mainly composed of mountains and basins. Mountains account for about 85% of the county's area, and Yuehe Basin occupies 15% of the county's area. Hanyin County has a subtropical continental monsoon climate, warm and humid, and abundant in rainfall. Spring is short and windy, with large temperature changes, often with cold air intrusion, sometimes accompanied by cold spring; summer is long and hot and rainy, with heavy rains, hail, and often summer and drought; autumn is short and cools quickly, often with rainy weather, and September is Rainfall days throughout the year and the months with the most rainfall; winter is less severe and cold, rain and snow are less, and winter droughts are common. Due to the vertical difference of terrain, the vertical zoning of climate conditions is obvious. The annual average temperature is 12.7-15.8°C. The temperature decreases from Yuehe River and Hanjiang River to both sides. The county's annual average temperature is 15.8°C in Puxi Town and 12.7°C in Tianchi Town in Hanyang. The extreme maximum temperature is 40.1°C, and the extreme minimum temperature is -10.1°C. The county's average annual rainfall is 932.4 mm, the maximum annual rainfall is 1199.2 mm, and the minimum annual rainfall is 627.4 mm.

3. Overview of man-made geological disasters in Hanyin County

With the increase of population and economic development, human beings are transforming the natural environment more and more, both positive and negative. Therefore, more and more human engineering economic activities directly induce or exacerbate the occurrence of geological disasters.

3.1. Building houses on slopes, man-made hidden dangers

With the increase of the population and the improvement of living conditions, people need to build a large number of houses. The majority of people in mountainous areas build houses at the foot of slopes, on both sides of rivers and valleys, in depressions on the slopes of mountain slopes or at the mouth of a ditch. Because these places are more convenient for building houses, traffic and water use, and do not occupy arable land. Due to the construction of houses and the excavation of the slope toe, an empty surface is formed at the front or slope of the slope. If protection is not carried out in time, these areas are often landslide-prone areas.

3.2. Slope reclamation, destruction of vegetation, and inducing landslides

As the population increases, arable land has become particularly important, so a large number of slopes are reclaimed or dry land is turned into paddy fields, thereby increasing the infiltration of surface water. These engineering activities often induce or exacerbate the occurrence of landslides and other geological disasters in mountainous areas and slopes. In addition, burning mountains to open up wasteland and the indiscriminate felling of bamboo and wood destroys the ecological balance, causes abnormal weather, frequent heavy rains, and increases the frequency of geological disasters such as landslides, avalanches, and landslides.

3.3. Engineering construction, destabilizing the slope

With the development of the economy, the highway network has initially formed. Mountain roads are generally built at the foot of the slope or halfway up the mountain. 80% of the road sections need to be excavated, which disrupts the balance of the original slope. Under the action of gravity, external forces and rainfall, geological disasters often occur landslides, affecting normal conditions. Transportation; the vigorous development of reservoirs and hydropower stations has also induced many geological disasters. A large amount of soil and rock materials are needed for treatment, and these materials are mainly mined on the spot. Mining inevitably forms high and steep slopes or high open faces. A large number of blasting during mining also loosened the unmined rock mass. This mining activity creates favorable terrain conditions for subsequent landslides and collapses. With the construction of reservoirs and hydropower stations, with the storage of water in the reservoir area, the groundwater level rises, making the rock and soil in the reservoir area saturated, softening the rock and soil, forming a weak surface, and creating internal conditions for the occurrence of landslides and collapses.

3.4. Mining and quarrying, digging hills and cutting slopes, randomly stacking and discarding slag

Mine, quarrying irrationally piling up slag provides material conditions for debris flow disasters. In addition, irregular open-pit mining is prone to rock collapse. Human engineering economic activities in Hanyin County are the main cause of geological disasters, but it is impossible to stop construction and development because of this. Human engineering economic activity.

4. Environmental protection and geological disaster prevention measures in Hanyin County

4.1. Implement the policy of combining protection and utilization

In economic and social construction, the policy of combining protection and utilization must be implemented. The first is to standardize human engineering activities, eliminate unreasonable human engineering activities, and carry out social and economic construction on the premise of protecting the geological environment. The second is to select scientific and appropriate development and utilization methods according to the characteristics of the county's geological environment, and rationally use the geological environment without destroying the geological environment or having no obvious impact on the geological environment. Third, while economic development, it is necessary to gradually increase funding input for geological environmental protection, continue to implement the "Beautiful Mountains and Rivers Project", and continue to implement water and soil conservation measures such as closing hills for afforestation, prohibiting cutting and grazing, and returning farmland to forests to control soil erosion and continuously improve the geological environment.

4.2. Attach great importance to geo-environmental protection and geo-hazard prevention and control planning

With the development of society and economy, various human engineering activities have shown an obvious trend of increasing. Human engineering activities have become the direct cause and huge driving force of geological disasters in the county. Strengthening the protection of geological environmental protection and the prevention and control of geological disasters has become an unquestionable important matter. How to carry out geological environmental protection and geological disaster prevention, first of all, we must have a scientific, comprehensive, and detailed plan for geological environmental protection and geological

disaster prevention, and guide the county's geological environmental protection work in stages, districts, and categories to minimize disaster losses.

4.3. Strengthen geological environment monitoring and data accumulation

Establish a geological environment monitoring network focusing on the geological environment and mine geological environment, grasp the dynamics of the geological environment in time, accumulate geological environment monitoring data, and provide dynamic data for geological environmental protection and geological disaster prevention. Strengthen the record management of geological disaster prevention and control projects, pay attention to the accumulation of relevant information, collect, register and record the past geological disasters; carefully fill in the field survey cards for new geological disasters to provide a scientific basis for the early warning of geological disasters.

4.4. Continue to attach importance to the education of geological disaster prevention knowledge and the improvement of the mass monitoring and prevention network system

Strengthening the education of geological disaster prevention and control knowledge, raising the awareness of disaster prevention and mitigation of the masses, and relying on the masses to establish a mass monitoring and prevention network system are the most effective methods for disaster prevention and mitigation in rural my country. We should continue to attach importance to the development of various forms of geological disaster prevention knowledge education such as television, radio, blackboard newspapers, posters, centralized lectures, rural guidance, cultural programs, etc., to improve the people's awareness of disaster prevention and mitigation, mobilize the masses, rely on the masses, and establish group surveys. Group defense network system.

4.5. Establish an efficient geological disaster information system

With the accumulation and deepening of long-term research, the multi-source, ambiguity, non-determinism and random suddenness of geological disaster information make the geological disaster information processing and spatial comprehensive analysis model very complicated. The amount of data required is huge, and the spatial data structure and type are complex, so that the past data storage forms and management methods are far from meeting the needs. Therefore, how to efficiently store and manage the massive data of geological disasters and conduct multi-level analysis of spatial data has become a bottleneck restricting the research of geological disasters. Therefore, it is necessary to establish an effective geological disaster information system based on the results of the field survey of geological disasters, including the establishment of graphic databases, the establishment of attribute databases, the establishment of external databases of geological disasters and multimedia databases. Starting with the effective acquisition, storage, query and processing of spatial data information, a thematic applied geographic information system is established to provide a service platform for relevant government departments, the public and professional and technical personnel.

5. Conclusion

In addition to the influence of natural factors, human engineering economic activities are one of the main factors that induce geological disasters, which are mainly manifested in road repairs, construction of houses and excavation of slope toe, which destroy the stability of slopes and induce landslides and collapses; steep slope reclamation increases Soil erosion has aggravated the hazards of ditch and mud-rock flow; planting and irrigation of slopes in the territory is also common, causing water seepage to induce landslides; mining and quarrying, randomly piled up and discarded slag, is easy to cause landslides, collapse and geological hazards, which in turn

induces mud-rock flows occur. Therefore, to prevent the occurrence of geological disasters and reduce the losses caused by geological disasters, it is necessary to put an end to human irregularities in order to prevent the emergence of new hidden dangers of geological disasters.

References

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