

Study on the Development and Protection Strategy of Geopark of Geological Relics Based on the Idea of Sustainable Development

-- Taking Taishan World Geopark as an example

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Abstract: Taishan tourism economy is the pillar industry of Tai'an's economic development and the "leader" of local industry. According to the tourism development strategy of Tai'an City, the tourism of Mount Taishan is the core and the tourism of surrounding areas is the supplement. With Mount Taishan driving the surrounding areas and tourism driving other industries, we can realize a comprehensive tourism economic structure of common development and common prosperity. Strengthening the protection, rational development and utilization of geological relics will promote the development of tourism industry and regional economy, and improve the living standard and scientific and cultural quality of residents where geological relics are located. As the world's first "World Natural and Cultural Heritage" site, Mount Taishan has rich research resources and protection and development prospects in environmental landscape, geological structure and plant ecology. Based on the idea of sustainable development, this paper establishes a standardized management mechanism, coordinates the management responsibilities of various departments, strengthens the professional training of employees in geoparks, holds special seminars on the construction and management of geoparks, and strengthens the exchanges with other industries to make up for the lack of knowledge and experience of geoparks, so as to promote the healthy and sustainable development of Taishan World Geopark.

Keywords: Sustainable development, Geological relics, Develop and protect strategies, Taishan World Geopark.

1. Introduction

Geological relics are precious and non renewable geological phenomena formed, developed and left over by various internal and external geological processes during the long geological history of the earth's evolution. It is not only an important natural tourism resource, but also a non renewable natural heritage. Like mineral resources, geological relics are also very precious and non renewable natural resources, and an important part of the ecological environment. Mineral resources, as one of the means of production and living of human beings, are the most original production objects of human beings and a kind of exhaustible natural resources, while geological relics mainly meet people's spiritual needs. With the vigorous development of geological tourism, some rare typical geological heritage landscapes with high scientific research value and ornamental value are protected and developed by the way of establishing geological parks. Taking Taishan World Geopark as an example, Mount Taishan's tourism economy is the pillar industry of the economic development of Tai'an City and the "leader" of the local industry [1-2]. According to the tourism development strategy of Tai'an City, it is established to take Mount Taishan tourism as the core and tourism in surrounding areas as the supplement; With Mount Taishan driving the surrounding areas and tourism driving other industries, we will achieve a comprehensive tourism economic structure of common development and common prosperity. Mount Taishan Scenic Area is a traditional, large and complex scenic area, so the domestic research on Mount Taishan Scenic Area is also multi-level and comprehensive. There are more and more in-depth studies on geology and geomorphology, ecological vegetation, environmental

landscape, art architecture, culture and history, tourism development, etc. In Tai'an City, Taishan Mountain is the core park, and Culai Mountain, Lianhua Mountain, Tao Mountain and other areas are the peripheral geological heritage scenic spots, which has realized the effective integration of tourism geoscience resources in the region, and further improved the taste and connotation of tourism [3].

The correct understanding and protection of geological relics is an important factor for the sustainable development of human society. Strengthening the protection and rational development and utilization of geological relics will promote the development of tourism industry and regional economy, and improve the living standard and scientific and cultural quality of residents in the geological relics. As the world's first "World Natural and Cultural Heritage", Mount Taishan has rich research resources and protection and development prospects in environmental landscape, geological structure, plant ecology, etc. Through the analysis of the environmental landscape of Mount Taishan Scenic Area, we strive to explore a sustainable development path suitable for the natural resources and human resources of Mount Taishan Scenic Area. In view of the current management situation of Mount Taishan Global Geopark, this paper establishes a standardized management mechanism based on the idea of sustainable development, coordinates the management responsibilities of various departments, strengthens the professional training of geopark practitioners, holds symposiums on the construction and management of geoparks, strengthens exchanges with the industry, makes up for the lack of knowledge and experience of various geoparks, and promotes the healthy and sustainable development of the cause of Mount Taishan Global Geopark [4-5].

2. Overview of Taishan World Geopark

Mount Taishan is honored as the "top of the five mountains", with numerous cultural relics and historic sites, and is regarded as a symbol of the Chinese nation's pragmatic and enterprising spirit. Emperors of all dynasties have protected Mount Taishan with great care. They have always sent important officials to serve in the region, strictly guarding Mount Taishan, or sent important officials to take charge of Mount Taishan. The geomorphic boundary of Mount Taishan is obvious and there are many types, which can be divided into four types: middle mountain of erosional structure, low mountain of erosional structure, erosional hill and alluvial proluvial platform in front of the mountain. In terms of spatial image, it not only creates the situation of overlapping mountains and soaring high in the sky, but also combines the majestic image of the overall mountain with a variety of terrain of group combination, presenting a rich and colorful landscape image [6]. These are the important resources of Mount Taishan as a world geological park. Taishan World Geopark is the best classroom for popularizing geological science knowledge. Turning the mythical interpretation of natural landscape into the interpretation of geological knowledge is conducive to establishing a materialistic world outlook, popularizing scientific knowledge, improving people's understanding of geological heritage, and protecting geological relics and the environment spontaneously. Mount Taishan has been included in the World Natural and Cultural Heritage List by UNESCO, becoming a valuable "double heritage" of mankind, effectively strengthening the protection and management of geological relics and other natural and cultural landscapes [7]. Mount Taishan protrudes from the central Shandong plain, forming a strong contrast of size and height with the surrounding plains and hills, showing a tendency of "pulling out the land to the sky". Mount Taishan has accumulated mountain momentum, and its main peak is towering, with a strong encouraging rhythm.

The foundation of Mount Taishan is broad, covering an area of square kilometers, and its shape is concentrated, giving people a sense of stability and heaviness. According to the distribution characteristics and regional combination characteristics of geological relics, the Taishan World Geopark is divided into two parks, namely the core park and the peripheral park, with a total area of 158.63km². Among them, the peripheral parks include Lianhua Mountain, Culai Mountain and Tao Mountain, three geological heritage scenic spots, and a series of peripheral scientific investigation points. Although the Taishan World Geopark has carried out field survey before its declaration, it has a general understanding of the evolution history of the park's geological development. However, since the successful application, some geoparks do not care about the thematic geoscience research of the parks. The Taishan World Geopark is supported by geological content. Whether in the excavation of scientific connotation, science popularization, or the development and protection of geological relics, it is inseparable from the necessary research

work of geological relics. Taishan World Geopark is a geological heritage landscape with special scientific significance, rare natural attributes, elegant aesthetic appreciation value, a certain scale and distribution range as the main body, integrating natural landscape and human landscape, protecting geological heritage, and providing people with a place with high scientific grade for sightseeing, vacation and leisure, health care, scientific education, and cultural entertainment [8-9]. The unique grotesque peaks and rocks in the Taishan World Geopark include Xiema Cliff, Cloud Chopping Sword, Flying Stone, Sacrificial Cliff, Immortal Bridge, Zhangren Peak, Gongbei Stone, Drunken Stone, etc. There are also many strange landscapes, such as colorful stone streams and fan cliffs. They add static landscape points to Mount Taishan with the charm of stone.

3. Research on Development and Protection Strategy of Geological Relics in Taishan World Geopark Based on Sustainable Development Thought

3.1. Analysis of Tourism Status of Mount Taishan Geopark in the World

As a world natural and cultural heritage, Mount Taishan, a national key scenic spot and national forest park, has precious historical and cultural value, unique scenic aesthetic value, typical geological research value and biodiversity protection value. The historical and cultural value, aesthetic value, geological value and biodiversity value of Mount Taishan landscape resources are organically integrated, which is rare not only in China but also in the world [10]. At present, the number of tourists to Mount Taishan is increasing year by year in China, and the international tourists are mainly from Hong Kong, Macao and Taiwan and Southeast Asia. With the establishment of Taishan World Geopark, the popularity of Mount Taishan as an important geological relic landscape and a famous cultural mountain will be further enhanced, so that tourists from all over the world can know more about Mount Taishan, walk into Mount Taishan and enjoy the magnificent natural and cultural landscape of Taishan World Geopark [11]. The landscape resources of Mount Taishan have a strong sense of sequence, characterized by "three spaces and one axis". The sequence of climbing to heaven takes Yaocan Pavilion, Zhongtianmen and Daiding as the nodes, representing the triple space of the underworld, the human world and the celestial world, and takes Tianmen, Zhongtianmen and Nantianmen as the three major rhythms from the human world to the celestial world, during which "three miles, one flagpole and five miles, one archway" constitute the sacred atmosphere of stepping up step by step, forming the "human landscape axis" of Mount Taishan scenic spot [12]. From Yaocan Pavilion to Daiding is a long tour line, changing scenery, which embodies the characteristics of dynamic view. During the period of meditation, it plays an important supporting role in the tour. A dynamic two-stage landscape sequence is shown in Figure 1.

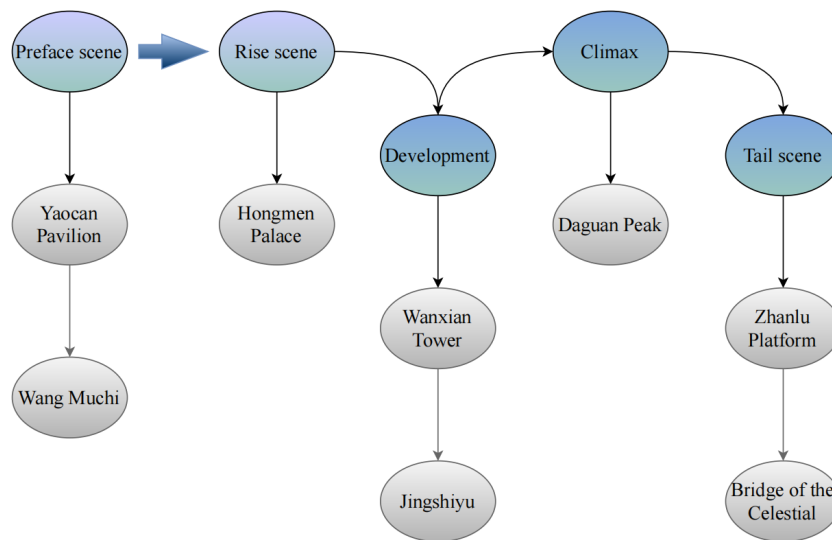


Figure 1. Schematic Diagram of Dynamic Two segment Landscape Sequence

As Mount Taishan has a long history of tourism, the development of tourism industry has been quite mature. From the statistical data of 2018-2021, the number of tourists in Mount Taishan is relatively stable, basically fluctuating at 2.2

million. Among them, the average number of domestic tourists is 2.15 million, while the proportion of foreign tourists is very small, averaging 19000, as shown in Table 1.

Table 1. Statistics of tourists to Mount Taishan from 2018 to 2021

Particular year	Total person time	Domestic tourists	Foreign tourists
2018	212	209	1.7
2019	220	217	1.9
2020	205	203	1.8
2021	176	174	2.1
Total	813	803	7.5

Taishan World Geopark is composed of geological relics with aesthetic appreciation value. It takes science as the theme to enhance the tourism brand of Taishan World Geopark. However, some of the publicity themes of Taishan World Geopark put the cart before the horse. Some explanations are not scientific enough, while others are too professional and not easy to understand. Therefore, it is necessary to plan the interpretation system of Taishan World Geopark, strengthen the training of tour guides and improve the professional level.

3.2. Sustainable development of geological relics and landscape features of Taishan World Geopark

The formation of Mount Taishan has undergone five geological historical stages of transformation, including Archean, Proterozoic, Paleozoic, Mesozoic and Cenozoic. The neotectonic movement has a controlling effect on the mountain and topographic relief of Mount Taishan. The intense activities of Yunbuqiao fault, Zhongtianmen fault and Taiqian fault have created the majestic mountain posture of Mount Taishan. Taishan World Geopark is a large and complex scenic spot, which covers a large area, has many influencing factors, and its complex and changeable situation is the obvious feature of this kind of scenic spot. Doing a good job in functional zoning can reasonably, systematically and quickly solve the problems arising from perfecting jing yuan management, planning cultural relics protection, maintaining ecological balance and avoiding the imbalance of tourist rate.

Under the influence of neotectonic movement, the vertical erosion and cutting action of Mount Taishan is very strong, forming different types of erosion landforms, as well as many deep valleys, cliffs and strange peaks, and shaping many peculiar micro-landforms. Such as the majestic Aolai Mountain, the big and small candle peaks, etc.

In the principle of overall planning of Taishan World Geopark, the principle of uniqueness of management boundary should be adopted. In space, managers only face one boundary, that is, zoning boundary. The planning requirements of resource protection, tourism activities and facilities construction are all linked with zoning. The zoning planning principle should be formulated to control the nature of human activities, facilities construction and land use at zoning level, so that managers can implement management according to the sustainable development content of zoning control planning. According to the analysis of the present situation of protection and utilization, the protection of geological relics in Taishan World Geopark should be integrated into the sustainable development to realize the protective utilization of geological relics. On the one hand, we should effectively protect the geological heritage resources of Taishan World Geopark to improve its sustainable development and tourism popularity; on the other hand, we should actively integrate the geological heritage resources of Taishan World Geopark with other tourism resources, and promote the protection of geological heritage through the development of tourism economy.

4. Conclusions

The special natural geographical environment, geological structure background and profound cultural heritage of Mount Taishan have developed tourism geological resources mainly based on profound Precambrian geology, unique new structures and geomorphic landscapes. Evaluate and grade the types of geological relics in the geological park, divide the protection areas of different levels, and protect the geological relics in the protection area accordingly. The primary task is to protect the geological relics and geological environment, and the main content is to promote the tourism development of Dunhuang City, with science education, geological sightseeing, desert exploration and other environment-friendly popular science tourism as the main content. Establish the concept of economical development to promote the continuation of geological heritage protection and geological heritage resources development potential. In the process of geological heritage development, we should scientifically determine the theoretical price and standard of geological heritage resources, promote the development, utilization and protection of geological heritage resources to the market, realize the resource use compensation system and legalize it, and urge users to cherish, save and protect geological resources. At present, China's geological parks are developing in the direction of multi types, multi regions, multi characteristics and multi exchanges, and have changed from the initial re development to the guiding idea of combining protection and development: taking popular science tourism as the theme to meet the needs of contemporary tourists for viewing and knowledge; Only by realizing the sustainable development of the park can it be built into a first-class geological park at home and abroad that is well protected, reasonably developed and has unified economic, social and environmental benefits. The protection of geological relics is the primary task, and the sustainable development path is adhered to.

References

- [1] Wang Y J, Dong Y, Hou Q R, et al. Current Situation and Protection Strategy of Wild Orchidaceae Resources in Qinling Mountains[J]. Heilongjiang Agricultural Sciences, 2019, 37(27):34-55.
- [2] Wang Z X. Development and Protection of Geotourism in Shennongjia, Hubei Province[J]. Territory & Natural Resources Study, 2017, 22(7):17-33.
- [3] Wang S, Shu Z H, Guo K B, et al. Development of grouting materials with application to the protection of the geological relics of the Weng'an Biota[J]. Journal of Mountain Science: English, 2019, 28(8):13-27.
- [4] Jian L, Chen W, Li C, et al. Geological Relics and Tourism Geoscience Significance of Shiniuzhai National Geopark in Pingjiang[J]. Land & Resources Herald, 2017, 37(11):10-17.
- [5] Wang C, Tian J, Cao F, et al. Evaluation and Protection of Geological Relics in Huayingshan National Geological Park[J]. Journal of Southwest Petroleum University(Social Sciences Edition), 2019, 27(14):21-28.
- [6] Zhao B. Study on Evaluation Development and Utilization of Important Geological Heritage Resources in Jining City[J]. Shandong Land and Resources, 2017, 37(18):27-47.
- [7] Song B. Study on Types of Tourism Geology Resources and Protection and Development in Jining City[J]. Shandong Land and Resources, 2017, 39(17):28-48.
- [8] Wang W W. Exploration and Practice of the Zigong World Geopark to Promotion of Community Development[J]. Acta Geologica Sichuan, 2019, 30(7):18-29.
- [9] Li Z, Chen F. Study on the Characteristics and Scientific Values of Geological Heritage of Shennongjia World Geopark[J]. Journal of Green Science and Technology, 2019, 23(11):26-47.
- [10] Dong M, Xie X, Bing L I, et al. Analysis of landscape resource and sustainable development of geological relics——Taking the reef geological park in Anxian County as an example[J]. Journal of Henan Institute of Science and Technology(Natural Science Edition), 2018, 30(12):16-24.
- [11] Ye Y. Marine Geological Hazard Prevention and Social Economic Sustainable Development - ScienceDirect[J]. Marine Geo-Hazards in China, 2017, 22(10):689-710.
- [12] Rana S V S. Contribution of Toxicology in Sustainable Development[J]. Journal of environmental biology, 2022, 12(1):43-52.