

Analysis of the Characteristics of Landscape Resources of Yuntai-mountain in Shibing County of Qiandongnan

Xiaojing Wu^{1,2,*}

¹College of Civil Engineering and Architecture, Zhejiang University, Hangzhou, Zhejiang, China

²College of Architecture and Urban Planning, Guizhou University, Guiyang, Guizhou, China

*Corresponding Author.

Abstract: The natural and geographical conditions of Yuntai-Mountain in Shibing county of Qiandongnan is superior. It has a unique karst landscape of dolomite and has been rated as a World Natural Heritage Site. Based on on-site investigation, this article provides a detailed overview of the types of landscape resources and summarize their landscape characteristics through industry standardized and scientific methods. The conclusion is that it has rich Landscape resources, such as geological-relics-landscape, sky- Landscape, Bio-Landscape, Cultural-Landscape, etc. Because it is located on the slopes of the transition on central Guizhou Mountain to the Western- Hunan Hills, the terrain of west and northwest is higher than it of the east and southeast. There are many deep gaps in the region. It is steep, inaccessible, forming a unique subtropical original dolomite karst landscape.

Keywords: Yuntai-Mountain of Shibing County; World Heritage; landscape Resources; Dolomite Karst

1. Overview of the Study Site

Yuntai-Mountain Scenic Area of Shibing County is located in the eastern part of Guizhou Province, northwest of Qiandongnan Miao and Dong Minority Autonomous Prefecture, 13 kilometers north of Shibing County. Its geographic coordinates center is longitude east $108^{\circ} 05' 29''$, latitude north $27^{\circ} 10' 05''$. The total area of the scenic area is 64 square kilometers. It is on the slope of transition from Central-Guizhou mountains district to Wester-Hunan Hills district, which is Mid-level Mountains Area of Guizhou Province. The terrain gradually decreases

from the west and northwest to the east and southeast [1], which is a Humid Tropical and Subtropical Karst Plateau deeply cut by rivers. The geological landscape in the area is Dolomite Karst, with an Average Elevation of about 526m, the Highest Elevation of 1869.3m, and the Lowest Elevation of 486m, with a large drop, steep mountains, and scarcely visited [2]. Due to its unique topography and superior natural landscape conditions, together with Guilin in Guangxi and Jinfo Mountain in Chongqing, it has become the second phase of the World Natural Heritage of "Southern-China Karst"[3].

2. Research Methods

Firstly, through the Method of On-Site Survey we collected the landscape resource information of Yuntai-Mountain of Shibing County. Then, according to the classification in Table 3.2.3 in Article 3.2.3 of "Planning Standards for Scenic Areas GB 50298-1999" (i.e., the landscape resources are classified into three layers of large, medium and small categories, where the large categories are mainly divided into Natural-Resources and Humanities-Resources according to the customs, the medium categories are the species layer of the landscape sources, and the small categories are the morphological layer of the landscape sources), the landscape resources of the place are classified. Then, through the Delphi-Survey-Method, the preliminary conclusions of the assessment were subjected to expert correspondence by means of anonymous correspondence to ensure the objectivity, representativeness and professionalism of the research results. Finally, the characteristics of landscape

resources of Yuntai-Mountain in Shibing County are summarized and concluded.

County have two major categories of natural and humanistic landscapes. Meanwhile, there are seven medium categories such as Sky-Scenery, Ground-Scenery, Water-Scenery, Biological-Scenery, scenic spots, buildings, and sights, as well as 24 subcategories of morphology layers.

3. Results and Analysis

3.1 Classification of Landscape Resources

The Field-Survey shows that the scenic resources of Yuntai-Mountain in Shibing

Table 1. Classification of landscape resources of Yuntai-Mountain in Shibing County

Major category	medium category	subcategories	Scenery/Sites	
natural landscapes	Sky-Scenery	rainbow haze mirage	Reflect- Plow- Pavilion; See-cloud-sea; Outside-yingtai	
		clouds and mist landscape	Expel-cloud-pass; See-cloud-sea	
		ice-snow-frost and dew	Frozen and snow-covered mountains and forests in winter	
	Ground-Scenery	mountain view	Pingshan-Man; Tiger's whine flat; Tiger's back; Knifeback ridge; Coiled Dragon Pass; Outside-yingtai; Vine-twisting path	
		peaks	Candlestick Peak; Benjiashan mesa-like Peak Cluster; Five-fingers-peak Stone Peak Pillar Group; Alone-horn-stone.	
		canyons	Chadian-River canyon; Canyon down the Railroad-bridge	
		caves	White-horse Cave; Bison Cave; Cold wind cave; Bell-and-Drum Cave	
		stone forests and stone scenery	Fan-paneled rock; Granny face stone; The lithophytic landscape of plants	
		geological treasures	Wave scar; Curbside Calcification; Jewel Court; Water Drop Goddess of Mercy	
		spring view	Cherry Springs	
	Water-Scenery	streams	Chadian-River	
		rivers	Cedar River; Huangzhou-River; Chadian-River	
		ponds	Cherry Lake	
		ancient trees	The king of sour jujube; Strange tree (South-China Thick-skinned incense)	
	Biological-Scenery	rare creatures	Rare and endangered plants: Ginkgo; tulip tree; Bletilla; southern red bean tree; amentotaxus; Emmenopterys Rare and endangered species: Clouded leopard; Black-necked pheasant; White-necked pheasant; Macaque; Pangolin; Musk deer; Takin; Nemorhaedus goral	
		plant ecological taxa	Pedunculated root.plant epiphyte; Vegetative wetness(Coiled Dragon Pass) Vertical adaptive distribution of vegetation; Evergreen sclerophyll forest; Parasitic plant; Mosses on rocks. Riparian-riverine scrub (Narrow-leaved Mosquito Tree; Dogbane; River-bank holly).	
		climatic seasons	Red autumnal leaves(the autumn and winter seasons); Ice, frost and snow dew(winter)	
	humanistic landscapes	scenic spots	ruins	Old-governess Pagoda; Main Buddhist temple; Temple of the founder; Ruins of Nine Rooms and ruins of the Palace of Guan-Sheng; Pianqiao Post-road
			grottoes	Greeting Gods cave

		memorial sites	Heichong Battle Site(monuments); Jiansheng road; The first gateway of the Spirit Pass; The second gateway of the Spirit Pass
	buildings	scenic buildings	Yuntai pass; Railroad -bridge; Ferry Cloud Bridge; Meet Immortals Bridge; Mountain-gate with sky covered with flowers and rain、
		religious buildings	Xu Gong Temple; Zhou Gong Temple; Transit Luck Temple ; Three-Official Hall
	sights	myths and legends	Cherry Bay(Cherry and Agui); Xu Gong practice Daoism; Zhou Gong practice Daoism; Bijia Mountain; Jewel Court; 、 Bell –and-Drum Cave; Ferry Cloud Bridge
		local characters	Xu Gong; Zhou Gong

As seen in Table 1, the natural landscape of Yuntai-Mountain in Shibing County, the Sky-Scenery have 3 subcategories, include the rainbow haze mirage, clouds and mist landscape, ice-snow-frost and dew, etc. Ground-Scenery have 6 subcategories, such as mountain view, peaks, canyons, caves, stone forests and stone scenery, geological treasures, etc. Water-Scenery have 4 subcategories, such as a spring view, streams, rivers, ponds, etc. Biological-Scenery have 4 subcategories, such as the ancient trees, rare creatures, plant ecological taxa, climatic seasons, etc. There are a total of 17 subclasses. Moreover, there are three kinds of humanistic landscapes, namely, scenic spots, buildings and sights, among which there are three subcategories of scenic spots, including ruins, grottoes and memorial sites; two subcategories of buildings, including scenic buildings and religious buildings; and two subcategories of sights, including myths and legends, and local characters. In totally, there are seven subcategories.

3.2 Analysis of Characterization of Landscape Resources

3.2.1 Unique dolomite karst landscape

The term of Karst comes from the name of the carbonate plateau of the Istrian peninsula in the northwestern part of the former Yugoslavia, locally known as Kras, meaning rocky exposed places. Formation of Karst landform is due to the water with solvency dissolving soluble rock and other effects, the formation of the surface and subsurface form of the general term, also known as karst landform. It is mainly dissolution and erosion, but also includes

running water erosion, submerged erosion, as well as slumping and other mechanical erosion processes. This action and its resulting phenomena are collectively known as karst. Karst landforms are distributed in soluble rock areas around the world. Karst landforms are categorized into four types according to their lithology, i.e. Limestone Karst, Dolomite Karst, Gypsum Karst, and Rock-Salt Karst. Yuntai- Mountain in Shibing County of Qiandongnan is located in the subtropical humid tropical climate area, and its geological base is dolomite, forming a special Dolomite Karst geological landscape [4].



Figure 1. Slash-like texture of Knifeback Ridge



Figure 2. Five-Fingers-Peak Crested Dolomite



Figure 3. V-shaped Canyon



Figure 4. Candlestick Peak and Bijia Mountain

Dolomite is a sedimentary carbonate rock with dolomite as its main component. Which rich in magnesium carbonate and grayish white in color. Dolomite has more gypsum sulfate minerals (such as barite, etc.) than limestone, and its bulk density is also higher and tougher than limestone. Dolomite usually has three groups of joints. After the surface of dolomite exposed, it is subjected to the weathering of the smooth joints [5]. And the calcite and dolomite in it are subjected to the differential weathering, which produces knife-cutting joints, such as the Knife-back Ridge and Tiger-back of Yuntai-Mountain (Figure 1), etc. In the craggy cliffs, the rock is stacked in layers in the horizontal direction, and the transverse texture is clear and orderly. Its façade is just like a knife-cutting and axe-chopping to form the lofty mountains, which is very spectacular.

3.2.2 Karst tapered peak cluster canyons

Compared to the wider distribution of another type of karst landscape - limestone, dolomite has low solubility, poor water permeability. So dolomite's karst role is much smaller than limestone. Then Shibing Yuntai-Mountain did not form a typical

limestone karst landscape, such as deep, long, large holes in the main karst caves, as well as stone forests, milky stone, stalagmites and other karst Landscape, nor formed a network of underground river system. Instead, they are mainly subjected to normal erosion on the ground, developing into aboveground peak forests and peak clusters [6]. For example, the five almost vertically inserted stone peaks of the Five-Fingers-peak (Figure 2) are staggered in height, distributed in a ring shape, with straight and high peaks connected at their bases, like the five fingers of a human being. At the base of these peaks and clusters, also due to the erosion of the river, the V-shaped (Figure 3) and box-shaped canyon landscape with thousands of gorges and ravines was formed, especially in the dry stream and the direct current with a large amount of water, where the water flow rapidly down-cutting effect, forming deep canyons, such as the Chadian-River Canyon and the railroad- bridge Canyon. Above the base of these mountains, tower-like peak forest karsts are mainly formed, such as Old-governess Pagoda, Bijia Mountain, Candlestick Peak (Figure 4), and Five-Fingers-Peak, etc. At the top of these peaks, which are as steep as a wall, as if they have been sharpened by knives, platforms are formed.

3.2.3 Wondrous peaks accompanying with the beautiful water

Yuntai Mountain's karst landscape with conical peak canyon developed on the basis of ancient dolomite nature in 570 million years ago. In addition that 150,000 years ago, the Himalayan-Movement made the region uplift intermittently and unevenly. The surface of Yuntai Mountain was divided into rocky peaks. Towering peaks distributed in clusters to form the peaks of the forest. And even the peaks of the forest clusters formed to the peaks of the clusters. These peaks were standing on all sides, vertically upward, straight into the sky. They had upright, steep and magnificent forms. Dolomite rock layer production was gentle, almost horizontal. Their vertical joints continued to dissolve, erosion and cut. Coupled with the pressure of their own weight and other roles, the rock surface along the joints continued to collapse. Then

the top of the peaks were formed in platform like being cut down, with the peaks' bodies being uneven thickness, different shapes, and formed in peculiar form of the pillars, such as Alone-horn-stone (Figure 5), Candlewick Peak, Bijia Mountain, etc. those landscapes highlighted the typical features of strangeness about the Yuntaishan mountain peaks.

Where there are mountains, there must be water. Yuntai Mountain has a well-developed surface water system. Streams and rivers are winding and flowing along the canyon. The water in Yuntai Mountain is suddenly bright and dynamic, suddenly mysterious and unpredictable, suddenly smooth and flowing, and suddenly quiet and gentle. It has the ever-flowing Chadian-River (Figure 6), the sweet cherry springs, the Water Drop Goddess of Mercy as if manna fallen from the sky, the wet puddles formed by the forested gorges due to abundant precipitation and forest closure, as well as the year-round cherry lakes surrounded by artificial dams. These waters, which are hidden from view, come from an unknown source and go to an unknown place, are loving and beautiful.



Figure 5. Alone-Horn-Stone



Figure 6. Chadian-River



Figure 7. Thick Fog in Expel-cloud-Pass



Figure 8. Sunrise and Clouds of See-cloud-Sea

3.2.4 Beautiful celestial wonders

Yuntai Mountain's celestial wonders are mainly clouds and sunrise landscape. Deng Zilong, a general of the Ming Dynasty, wrote a poem when he traveled to Yuntai Mountain: "Ten thousand mountains are high up in Yuntai Mountain [7]. It is really marvelous to see them standing in a towering position. When you scratch your head while riding on the wind and walking in the void. The white clouds are scattered and the blue sky opens up." Clouds and sunrise often appear together, which is one of the most common and most splendid scenes in Yuntai Mountain.

The clouds and mist of Yuntai Mountain are regular visitors regardless of the season. Since Yuntai Mountain is a typical humid climate of the central subtropical mountains, the climate is mild and humid. No matter it is a cloudy and rainy day in autumn and winter, or in a clear morning in spring and summer, the humid water vapor steams upward and intertwines with the low and thick clouds, forming clouds and mists enveloping the sky and the earth as if it were a fairyland, which is also real and illusory. Especially in the Expel-cloud-pass, every morning there are dense clouds and mist filled (Figure 7). Because the pass is in a slit in the middle of two mountains, its

internal and external environments are blocked by the mountains in great difference. The clouds and fog form a very different landscape outside the pass and inside the pass. When the sun comes out, the fog in outside pass quickly dissipates, while the fog inside pass due to evaporation from the river, the fog vapor accumulates and cannot be discharged, so the clouds are like springs, rolling up and down, surging and not dispersing, spectacular.

To see the sunrise on Yuntai Mountain, the best viewpoints are See-cloud-sea in Heichong (Figure 8) and Reflect-Plow-Pavilion in the western part of the central scenic area. In the clear morning, when the morning sun's light drive away frozen overnight darkness. Early morning Yuntai Mountain gradually awakened from the dew. The fish-belly color of the sky began to be sprinkled with thin gold dust. Golden sunlight slowly gilded the clouds with a layer of gold edge. When the gold edge is getting brighter and brighter, brilliant beams of light went through the clouds to release the ten thousand of rays. Following by a round of golden sun jumped out. Below the sun, is the yuntai mountain such as a fairyland general up surging to melt the rolling fog. This thick fog like a dream like fantasy, entwining with each one peak, tumbling upward like a white dragon. The sunlight through the heavy mountains, and the clouds and fog intertwined, the dreamlike clouds reflected golden, brilliant, gorgeous, magnificent, so that people do not distinguish between heaven and earth.

3.2.5 Rich biological landscape

The rivers of Yuntai Mountain in Shibing County cut to format special karst topography and geomorphology with deep ravines and steep walls, canyons and shallow pits. So its topography is complex, steep mountains, less traveled [8]. Therefore everywhere is a dense forest, primitive and mysterious. Due to less human interference, coupled with the Yuntai Mountain is located in the central subtropical monsoon humid climate zone, warm in spring and cool in summer, abundant rainfall, there are a variety of biological species. Habitat is very rich, which is not lacking in rare and exotic

species. According to the survey, there are 1,352 species of higher-level plants in Yuntai Mountain, of which 70 species are listed in the Red List of Chinese Species and 16 species are listed in the Red List of the World Conservation Union (IUCN). These rare plants are mainly ginkgo, southern red bean tree, amentotaxus, tulip tree, emmenopterys, bletilla, etc [9]. There are 243 species of vertebrates listed in the Red List of Chinese Species, and 41 species of animals are listed in the Convention on International Trade in Endangered Species (CITES), including clouded leopards, black-necked pheasants, White-necked pheasants, macaques, pangolin, Musk deer, Takin, Nemorhaedus goral and other rare species. And there is also a wealth of insects and cave animals [10]. This is an important protection of biodiversity of the natural habitats, and is not to blame for the attention of the "treasure bowl of plants, animal treasures".

Walking in the Yuntai mountains of Shibing county, one can listen to birdsong everywhere, smell flowers step by step. One can see big old trees here and there, which are as thick as an arm's length. Such as the hairy veins of the southern sour jujube, which has been called the "king of sour jujube" for more than 200 years [11]. As well as the South China thick-skinned incense (Figure 9), the red-winged maple (Luofu maple), the ocotillo oak, and the Daming pine, and so on. It is not only an important ecosystem for us, but also a wonderful place for us to touch, feel and learn about nature.

3.2.6 Clear seasonal changes

Seasonal changes in the landscape of Yuntai Mountain in Shibing county can be summarized as spring tender, summer thick, autumn red, winter white, which has a clear seasonal variation.

In the spring, everything is revived. Tender new leaves are called out by the mountain birdsong. Yuntai mountain took off the dark green old clothes, replaced with young green leaves. In the spring breeze, they are nodding with a smile. yuntai mountain sleeping all winter glows with vitality.

In summer, the green color is so strong that it can't be melted, which decorates the reckless mountains of Yuntai Mountain.

Under backdroping of the white rock, Yuntai Mountain is more green and verdant. And the trickle of water flows slowly at the bottom of the mountain, which is a good scene of green water and green mountains. Autumn can be said to be the most beautiful season in Yuntai Mountain, in which some bright red leaves blossom in the rock crevices of the crags [12] (Figure 10), some covered in the sheer mountainside. This red is as far as the eye can see, jumping in the silence of the mountains. So that Yuntai Mountain exudes another kind of maturity of the enchanting.

In winter, especially during the coldest days of the Lunar New Year, the mountains, trees, and water of Yuntai Mountain are covered with ice and snow (Figure. 11). They are crystal clear, elegant and tranquil. The branches of the trees are covered with ice cream, like white flowers blooming on the cliffs with a silver dress. Due to the ice and snow closing roads, it was difficult for people to enter the mountain. Then making it possible for Yuntai Mountain, which had been bustling for a year, to finally sleep peacefully under the quiet ice and snow, and everything seemed to be frozen, including time.

Season as if it is a good at dressing the modeling master, which change the Yuntai Mountain into different seasonal clothes, or lively and playful, or, or passionate, or mature enchanting, or quiet and serene. It gives Yuntai Mountain with mysterious and unpredictable character, composed of a varied and peculiar landscape.



Figure 9. South-China Thick-Skinned Incense



Figure 10. Red Leaf in Autumn



Figure 11. Ice-covered Reflect-Plow-Pavilion



Figure 12. Xu Gong Temple

3.2.7 Strong religious and cultural landscape
Qiandongnan Prefecture is an ethnic autonomous region with a high concentration of Miao and Dong ethnic groups. Which has a long history and a long time of ethnic culture.

Earliest Yuntai Mountain Scenic Area was opened as the Taoist shrine by the Guizhou Pianqiao (Shibing'old name) thousand called Xu Zhenyuan in the year of the Ming Dynasty Longqing Ding-Mao (1567) , more than 400 years of history. At that time, Xu Zhenyuan, in order to admire the way of longevity, together with his colleague Zhou Huideng, abandoned their families and went to Yuntai Mountain to cultivate his life and realize the mystery. These two are the main

characters in the legend of Yuntai Mountain, Xu Gong and Zhou Gong. “*Guizhou Tongzhi*”, “*Qianlong Tongzhi*”, “*Qianji Poetry*”, “*Zhenyuan Fu Zhi*”, “*Shibing County Zhi*” and so on have written about it. Later, Yuntai Mountain was transformed into a Buddhist holy place, and then evolved into a religious resort where Buddhism and Taoism are united nowadays. Existing Xu Gong Temple (Figure 12) and Zhou Gong Temple are building sites to commemorate Xu Gong and Zhou Gong. In addition, there are other religious buildings as the Three-Official Hall, Transit Luck Temple and so on.

In the date of "March 3" in every year on the lunar calendar, thousands of Guizhou (especially Huangping, Shiqian, Yuqing, Zhenyuan, Zunyi, Tongren), as well as Yunnan and other places of good men and women, incense, tourists, Flocking to Yuntai Mountain for Pilgrimage. So the Yuntai Mountain has become a good place of near and dearly known as a religious pilgrimage, tourism [13]. There is a poem for proof: "March jade face cold spring orchid. The first three days of March towards Mount Yunshan. Morning bells and evening drums around the mountain beams. Sincerely heart is the spirit of worship three mountains." The rich religious and cultural atmosphere of Yuntai Mountain and the unique natural and pristine landscape make it a place of spirituality, beauty, oddity, danger and seclusion. And it has become a place of tourism and leisure with scientific value and humanistic spirit.

4. Conclusion

The landscape of Yuntai Mountain in Shibing County in Qiandongnan is a unique karst landscape developed on the basis of dolomite geology with subtropical humid climate. Most obviously its surface landscape is the landscape of peak forests and peak clusters of canyons. And its walls are straight and tops are platforms, which makes the landscape distinctive. Due to the large gap in the area, cliffs, canyons, deep and secluded. So men's footprints are rare. primary forests are well-preserved. With the humid climate, a wide variety of biological species, rich habitats, the scene with the seasonal changes are also very obvious, and

coupled with the unique local religious and cultural atmosphere, so Yuntai Mountain in Shibing County has become a set of special scenic spots with beautiful clouds and mist, strange peaks and water, good original ecological, strong religious and cultural characteristics, which is worthy of a rare dolomite karst landscape integrating nature and humanity.

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