

The Extension Work of Zigong UNESCO Global Geopark: An Example of Sustaining Local Communities

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Abstract: Zigong UNESCO Global Geopark is well known for its dinosaur findings and vertebrate fossils of the Middle Jurassic Period and a salt mine of the Triassic Period. It was recognized as member of the Global Geoparks Network in February 2008 and revalidated in December 2012. After the Administration for Zigong UNESCO Global Geopark submitted an extension application to UNESCO in November 2015, a new geopark territory was approved, which is 2720% larger than the area initially defined. More geological heritage as well as natural and cultural heritage has been included in and the increased number of communities of the territory is actively involved in the management and development of the geopark. Zigong UNESCO Global Geopark cooperates with those communities as to encourage geotourism with the help of inspiring local enterprises, creating new jobs and offering high quality training courses. The connection between Zigong UNESCO Global Geopark and communities have been gradually improved. So far, it has been proved that the geopark could not only support local sustainable development but also help local people to acquire earth knowledge as well as to improve their lives.

1 INTRODUCTION

Zigong UNESCO Global Geopark (UGGp) is located in Zigong Municipal City, Sichuan Province, Southwest of China. The geoheritage of Zigong UGGp is dominated by the extremely abundant dinosaur findings and other vertebrate fossils as well, the typical section of Ziliujing Formation of the Jurassic Period and the well mines, relics of mineral salt production, most of these are considered of national and international significance. This territory was recognized as a national geopark in 2001, one of the pioneer geoparks in China. On account of the widely and dispersedly distributed heritage resources, all large-scale sites, with the most typical and representative geosites were classified into three areas (five subareas) when the Administration for Zigong UGGp applied for its membership in the Global Geoparks Network in 2007. The three areas were separated from each other without a continuous boundary, and a total area of 56.62km²(Figure 1) (The Administration for Zigong Geopark of China, 2007).

However, as stated by the Statutes of the International Geoscience and Geopark Programme (IGGP) and the Operational Guidelines for UNESCO Global Geoparks (UNESCO, 2016), UNESCO Global Geoparks are single, unified geographical areas where sites and landscapes of international geological significance are managed with a holistic concept of protection, education and sustainable development. Moreover, the comments of UNESCO Global Geoparks Council suggest that Zigong Global Geopark must be promoted as a single area that all five scenic areas are physically united within a unified Global Geopark boundary (UNESCO, 2012). Therefore, with the purpose of following the Statutes of the IGGP and the Operational Guidelines for UNESCO Global Geoparks as well as the recommendations in the designation letter of Global Geoparks Network (GGN) membership in 2012 (Ref: SC/EES/GEO/12/8653)(UNESCO, 2012), the Administration for Zigong UGGp determined to unite all scattered areas and its important geosites within a unified UGGp boundary, and sustain local

communities and share these valuable geoheritage, latest research progress and the diverse cultures of this territory to the world. Zigong UGGp submitted the dossier of extension reapplication to UNESCO in November 2015 having been evaluated in August 2016. The “Green Card” for the extension work was endorsed during the 201st meeting of UNESCO Executive Board in May 2017, decided upon by the UNESCO Global Geoparks Council.



Figure 1: The sketch map of three areas, Zigong Global Geopark (The Administration for Zigong Geopark of China, 2007).

2 THE NEW BOUNDARY OF ZIGONG UGGP

The new boundary of Zigong UGGp after the approval of its extension is as follows in Figure 2 (The Administration for Zigong Geopark of China, 2015). The border of the western part and north-eastern part of the revised boundary is coinciding with the Administration border of Zigong Municipal City, and the other border is based on the topographic features. The revised boundary unites all the three old areas together, integrating several geosites, natural and cultural sites. The revised boundary of Zigong UGGp is entirely within the jurisdiction of Zigong Municipality, covering an area about 1630.46 km², 2720% larger than the area initially defined. Within the new UGGp boundary, there are four counties, 42 towns and 450 administrative villages with a total population of over 20,000,000 residents.

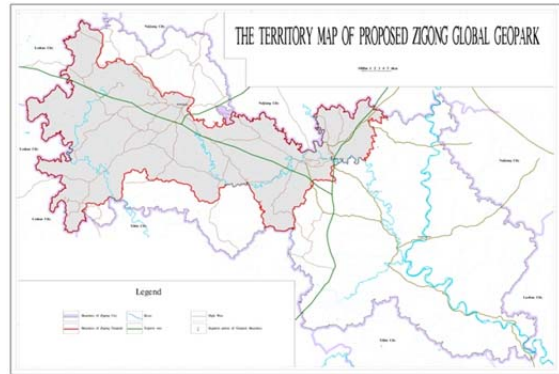


Figure 2: The new boundary map of Zigong UGGp (The Administration for Zigong Geopark of China, 2015).

A large number of geosites, and cultural sites with special value have been discovered since the geopark carried out an inventory in the area (Table 1) (The Administration for Zigong Geopark of China, 2015). In this framework, the Mesozoic strata that crop out continuously brought a great knowledge about the depositional environment of the dinosaur fossils systematically found and preserved. There are 18 new discovered dinosaur fossil sites discovered in Rongxian County, including the first dinosaur fossil discovered site in Zigong, the first scientific record on dinosaur fossil in Sichuan Province and even in Southwestern China, the first complete skeleton of dinosaur fossil in Rongxian, and the Weiyuan Anticline, which encloses rock salt reserves. The integration of all geological, cultural and ecological sites displays the important Earth history and cultural history of this area, affords more attractions for tourist, which boosts geotourism, meanwhile reduce the pressure over the environment capacity in old areas.

3 IMPROVEMENTS FOR THE UGGP AREA EXTENSION

With a view to fully implement recommendations for Zigong Geopark made by GGN Executive Board experts during the 2012 revalidation, the Administration for Zigong UGGp has implemented the following reform and improvement measures.

Table 1: A table of heritage sites in Zigong UGGp.

Main category of geoheritage	Quantity	International significance	National significance	For education	For research	For tourism
Paleontology (Figure 3)	39	4	3	4	39	3
Minerals and mineral deposits (Figure 4)	15	1	2	12	15	7
Geological section (Figure 5)	18	-	2	18	18	9
Geological structure	9	-	-	2	9	1
Landform landscape	13	-	-	12	13	8
Water landscape	9	-	-	5	5	4
TOTAL	103	5	7	53	99	32
Ecological heritage	5	-	1	5	5	3
Cultural heritage (Figure 6)	36	-	12	26	36	15
TOTAL	144	5	20	84	140	50



Figure 3: Dashanpu fossil fauna—the most famous burial site in the world.



Figure 6: Salt Industry History Museum—the first specialized salt museum in China.



Figure 4: Shenhai Well—the world’s first 1000-meter-deep well.



Figure 5: Fossil bearing section of Xiashaximiao Formation.

3.1 Management

The Administration for Zigong UGGp is led by the Mayor of Zigong City (Figure 7). The administrator office takes charge of the daily management. There were 236 staff members, including 21 talented people, covering more than 10 specialties. Staff capacity building plan has been made. Zigong UGGp provides training sessions for geopark staff members from UGG and CGN members. International and national experts were invited to our geopark to give lectures in the geopark. Both full-time and part-time tourist guides received appropriate trainings (Figure 8).



Figure 7: Management structure of Zigong UGGp.



Figure 8: Geopark staff training course.

3.2 Protection

Since 2012, Zigong UGGp has carried out a thorough investigation on various aspects of geosites, history, humanities, and ecology in Zigong area. *Overall Planning for the Zigong Global Geopark (2010-2020)* has been completed and a *Five-year Action Plan for the Zigong Global Geopark (2012-2016)* has been formulated. The *Five-year Action Plan of Zigong Global Geopark (2017-2021)* has been compiled.

Zigong UGGp established the safety supervision mechanism, implemented graded protection, and upgraded the protection database in order to achieve the comprehensive geoheritage protection. A lot of activities of heritage protection have been hosted to promote the conception of protect our territory and precious heritage in schools and communities (Figure 9).

More than 28.70 million RMB have been invested for the protection of geological heritage. In addition, more than 10 protection projects have been carried out (Figure 10).



Figure 9: Geopark exhibition in communities.



Figure 10: Geological protection projects.

3.3 Scientific Research



Figure 11: International symposium.

Table 2: The table of research projects.

Date	Item	Cooperating Unit
2011-2014	System classification research of Mamenchi saurus class	CAS Nanjing Institute of Geology and Paleontology
2012-Now	Research of weathering mechanism and protection methods of palaeontology	Sichuan University of Science and Engineering
2012-2013	Morphology and the function of the cervical spine of Sauropods	Flensburg university, Germany
2012-2014	Cooperative research of footprint fossils of theropod dinosaur at Gongjing, Zigong	China University of Geosciences (Beijing)
2014	"Zigong Jurassic dinosaurs fauna platform project" sub-project of "Sharing platform project of national rock fossils resources "	China University of Geosciences (Beijing)
2015	"Zigong Jurassic dinosaurs fauna platform project" sub-project of "Sharing platform project of national rock fossils resources "	China University of Geosciences (Beijing)
2015-Now	A detailed study of the Sichuan <i>gigantspinosaurus</i>	

Zigong UGGp has continuously improved its scientific research and achieved a number of knowledge progresses. In this context, it was carried out several research projects during the past years (Table 2) and set up the Jurassic Strata and Palaeontology Research Centre in 2015. During the same time several symposia have been hosted in the territory as well (Figure 11).

Since 2012, the Geopark has published 3 school monographs, 97 research papers (14 SCI indexed) and 11 books on science popularization, and 16 issues of the national and international public publication “Salt Industry History Research” have been published. In 2014 this journal was included in the CSSCI Source Journals Extended Edition Collection List (2014-2015).

3.4 Education

Zigong UGGp is considered as "Base for education and science popularization of the Ministry of Land and Resources", "National youth science and technology education base", and "National popular science education base", with the collaboration of local schools and communities, the Administration for Zigong UGGp hosted various activities (Figure 12,13, and 14).



Figure 12: Geopark little guide.



Figure 13: E-classroom with Hong Kong UGGp students.



Figure 14: Zigong students visited Hong Kong UGGp museum.

Since 2012, the Administration for Zigong UGGp has published a number of popular science books. The two books, *Uncovering Secrets of the First Dinosaur in Asia, Mamenchisaurus* and *Legend of Salt Wells and Hometown of Dinosaur* were elected as the most popular science works by the Ministry of Land and Resources in 2014 and 2015.

3.5 Visibility and Promotion

Through a global solicitation, Zigong UGGp logo and mascots (Figure 15) were collected and applied in the territory signage system, publications and tourist souvenirs. In order to increase the visibility, the Administration for Zigong UGGp prepared welcome panels in traffic roads and cooperated with the Zigong International Dinosaur Lantern Festival to carry out promotional activities in different areas (Figure 16). The Administration for Zigong UGGp also improved the visibility in geosites, cultural and natural sites, tourism centers, and museums.



Figure 15: Zigong Geopark logo and mascots.



Figure 16: Zigong Lantern Festival.

To promote the UGGp, Zigong hosted 12 promotion activities during the period between 2012 and 2016, published more than 30 types of brochures, leaflets, posters, reading materials, guide maps, and all are free for visitors. Zigong UGGp also positively improved its visibility in media, including cooperation with CCTV, produced TV programs, documentaries and films, operated its own website and geopark online show, and also cooperated with the e-commerce to sell tickets online.

3.6 Geotourism and Cooperation with Communities

Several geoparks within the Global Geoparks Network have already proved that they can sustain territory development. A geopark will not succeed without the support of local communities. It is significant to give local people a sense of pride in their region and sustain communities through using geoheritage and all other aspects of the area's natural and cultural heritage. Geoparks nowadays, being the tourist final destinations, encourage geotourism with the help of inspiring local enterprises, creating new jobs and offering training courses (Wang, 2015).

To reduce the old areas' pressure, Zigong UGGp developed new geotrails, including four geopark routes and seven rural tourism routes. The Shisun Valley, featured with geosites, cultural heritage sites, ecological tea base and geopark agritainments, closely linking the geopark with local communities, now has become a new popular touristic attraction. Scientific panels have been included in all museums and scenic spots to present the geological changes of Zigong UGGp. Geopark tourism guide panels have been established in accordance with the standard of the territorial signage system. Treasure Exhibition hall and Salt Production Exhibition hall were rebuilt. More displays in the flora and fauna hall in the dinosaur museum have been added, including fossils, panels, and videos. The Administration for Zigong UGGp made three new cartoon films, including the 4D movie--Jurassic Adventure (Figure 17).

In order to encourage communities and local enterprises to be involved in the Geopark development, Zigong UGGp have now 23 geopark partners, including eight local agritainments, 13 local enterprises and two geopark schools. Zigong UGGp and technical staff also cooperates with community in order to establish the Tuzhu Fossil

Village (Figure 18) and the Zhujiamiao Fossil Conservation Station.



Figure 17: 4D movie—Jurassic Adventure



Figure 18: Dinosaur paintings in the Tuzhu fossil village.

3.7 Network Activities

Zigong UGGp is actively involved in network activities. It designed 35 panels for GGN members in China in order to celebrate the 10-year anniversary for Chinese Geoparks Network in 2014, and hosted exhibitions in Zigong UGGp as well as Dalicangshang UGGp and Zhijindong UGGp. During the past four years, Zigong UGGp established twining agreements with 11 geoparks and carried out mutual visit and sharing activities. Zigong UGGp also takes part in the Global Geoparks Network meetings, sharing experiences with other GGN members, and providing technical trainings for our sister geoparks, delivering lectures and presentations for sharing UGGp concepts and knowledge.

4 CONCLUSIONS

Zigong UGGp is an old member of GGN with a history of 10 years. Due to its internationally and nationally significant geological resources as well as natural and culture heritage, Zigong UGGp attracts millions of visitors from all over the world each year.

However, only a few local communities could enjoy the benefits at first due to the limited geopark boundaries. Zigong UGGp successfully extended its territorial boundary in 2017, being a pioneer geopark which successfully reapplied its membership for the Global Geoparks Network in China. It has been a turning point after Zigong UGGp submitted its extension application that increasing communities are actively involved in the management and development of the geopark. Zigong UGGp cooperates with local communities to set up a new connection, not only the peripheral hardware but also quality of personnel, management and services, covering conservation, education, geotourism and sustainable development. So far, it has been proved that the geopark could not only support local sustainable development but also could help local people to acquire earth knowledge as well as to improve their lives.

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