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## North West Highlands Geopark Report Published

Issued by the Sutherland Partnership *Source:www.highland.gov.uk*

The North West Highlands Geopark, which covers much of North West Sutherland and Coigach in Wester Ross, is celebrating publication of its report on the 7th European Geoparks Network Conference, which it hosted.

This exciting development comes hard on the heels of recent Geopark successes in winning funding from the Scotland Rural Development Programme (SRDP) and from Awards for All – and even more recently, from The Highland Council's North, West and Central Sutherland Ward Discretionary funds.

The Geopark's new keynote report, "Landscapes and People – Earth Heritage, Culture and Economy", was launched in Tongue during a recent visit of The Highland Council Convener Sandy Park and Chief Executive Alistair Dodds. It will be used to help guide Geopark work over the next three years.

The report document contains articles from a wide range of eminent contributors, including Scottish Government minister Mike Russell, prominent members of the European Geopark Network and the British Geological Survey, SNH Chairman Andrew Thin, and senior representatives of Highland Council and the Crofters' Commission. Geopark Steering Group Vice-Chairman Alasdair Wood (Scourie CC) said, "This forward-looking and valuable report will help our Geopark to harness our geology and landscapes for the good of tourism, community activity and local enterprise. We are grateful to our contributors, and to Dr Issie MacPhail and her collaborators for editing and producing such an excellent "oadmap" for future Geopark activity."

Councillor George Farlow, a member of the Geopark Steering Group, agreed. "With a full-time Geopark Officer – Dr Fiona Mackenzie – now in post, the Geopark has immense potential to help promote and publicise the North-west Highlands. With world-class geology, landscapes and wildlife – to say nothing of our vibrant community spirit and local culture – we have a huge amount to offer. This report will help the Geopark to capitalise on that."

*Thanks for reading this newly redesigned newsletter. While the format has changed, it will still keep you up to date on events within the Global Geoparks Network. You are receiving this newsletter as you have expressed an interest in suggestions for the next issue, please feel free to contact:*

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## ***Psiloritis Geopark Revalidation***

The revalidation of Psiloritis Natural Park for continuing its membership to the European and Global Geoparks Networks took place with great success on 22 and 23 of June.

The evaluators, Mrs Elisabeth Pickett from the North Pennines Geopark, England and Claudia Eckhardt from Bergstrasse – Odenwald geopark, Germany had the chance to meet the members of the Management Committee, Majors of the area, and many other people related to tourism and accommodation, visited many of the infrastructure and out door facilities of the Park, walked through the “Mygias Trail” at its official opening to public, and discussed with the staff of Geopark and AKOMM.

The final decision will be taken during the next meeting of the Coordination Committee of European Geoparks that is going to be held in Naturtejo Geopark, Portugal on September 14th – 16th, 2009.

From June 15 to 16, the delegation from Xingwen Geopark had an investigation and communication in Stone Forest Geopark in Yunnan Province under the leadership of Qi Ming who was the director general of Xingwen Geopark Administration. Additionally, a twinning agreement was concluded between these two geoparks.

On June 15, a special symposium was held between the delegation and the officials concerned from Yunnan Stone Forest Geopark Administration, where Li Zhengping, the director general of Stone Forest Geopark Administration, introduced the basic condition, interior management, geopark planning, development status, revaluation and other matters in detail. Furthermore, two parties discussed their cooperation in such fields as geoscientific research, scenic area planning, marketing operation and personnel



*Xingwen Geopark* ©Zhao Hongshan



*Stone Forest Geopark* ©Stone Forest Geopark

## ***Twinning Agreement between Xingwen Geopark and Stone Forest Geopark***

exchange. The delegation saw into the development, construction, marketing, last revaluation and other things related to Stone Forest Geopark.

In the morning of June 16, Qi Ming and Li Zhengping signed the twinning agreement on behalf of these two geoparks respectively in the meeting room of Yunnan Stone Forest Tourist Center. In the afternoon, the delegation inspected the geomuseum, information monitoring system and other construction achievements in Stone Forest Geopark.

Stone Forest Geopark and Xingwen Geopark have many similarities in



*Li Zhengping (second from left) and Qi Ming (second from right) are signing the twinning agreement*

some aspects including geological formation and structure, so signing the twinning agreement is quite beneficial to their mutual learning and common development.

## Lochaber tourism campaign steps up

Source: [www.pressandjournal.co.uk](http://www.pressandjournal.co.uk)



LOCHABER'S campaign to increase public awareness of the area's geology and its great outdoors won ministerial blessing.

Environment Minister Roseanna Cunningham was on a fact-finding visit on the first day of the European Geopark Festival to hear about efforts being made to preserve its landscape.

She travelled to Lochaber Rural Complex at Torlundy, near Fort William, to discuss initiatives being undertaken by various organisations including Lochaber Geopark, the Nevis Partnership, Sunart Oakwoods and the Outdoor Capital of the UK project.

The minister told delegates: "The Lochaber Geopark is a fascinating project which, together with the North-West Highland Geopark, is dedicated to protecting the area's geological heritage and promoting sustainable development.

"Together with the local authority, Highlands and Islands Enterprise and a host of environmentally-focussed groups, much is being done to preserve the character of this unique area."

She was told that one of the latest initiatives was a proposal to extend the existing 1,350-mile International Appalachian Trail in the US with several hundreds of miles of paths in Scotland.

The existing US trail stretches from Maine to the Canadian provinces of New Brunswick, Quebec, Prince Edward Island, Nova Scotia and Newfoundland and Labrador,

connecting two countries, five provinces, one state, and the English, French and Celtic cultures of North America. A delegation from the Appalachian Trail is visiting Lochaber to promote closer links since ancient Scottish mountains and the American range were born from the same geological source.

Lochaber Geopark's project officer Keith Hoole said: "There is a huge amount of interest in this visit and we believe it is a wonderful opportunity to further our aims of promoting the Highlands on the global stage and to also publicise the International Appalachian Trail here".

Trail president Dick Anderson said: "The long-term goal is to locate sections of the trail in all the countries or regions that were once part of the ancient Caledonian-Appalachian Mountain range".

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## Huangshan Geopark Creates an E-database of Geoscientific Research Journals

Source: *Huangshan Geopark*

Since Huangshan Geopark joined the Global Geoparks Network, the management office of Huangshan

Geopark has cooperated with the No.332 geological brigade of Bureau of Geology and Mineral Exploration of Anhui Province, Chinese Academy of Geological Sciences, China University of Geosciences, National Geopark Planning and Research Center and other scientific research institutions in geological research of Huangshan to ascertain the process of formation and evolution of granite geological landform in Huangshan basically. Besides, they have fixed the leading position of Huangshan granite geoheritage landscape in Chinese granite landscape, on the whole, through the comparative research of topographical landscapes.

In order to enhance the level of geoscientific research of the Geopark and improve its abilities of self-oriented innovation and independent research, its management committee cooperated with Chongqing VIP Information Co., Ltd. in utilizing the server of its information center to create an e-database of geoscientific research journals after recruiting the geological master graduate last year.

The e-database consists of 475,026 PDF-formatted research papers from nearly 500 geoscientific journals over the period 1989-2009. Its site link is available on portal websites of the management committee and Huangshan Geopark respectively. Interior users of local area network of the management committee can download and share these papers. With the progress in scientific research, the e-database will be updated 6 to 8 times every year in future so as to keep up with the latest development of geological research. Its creation has provided professionals concerned with good research conditions and study platform and will drive the progress of Huangshan Geopark in geoscientific research greatly and facilitate its scientific development.





John Davison splitting stone layers

## Hexham children track down story in stone

Source: North Pennines AONB geopark

**Children from Hexham Middle School went on the trail of the story of stone as part of the North Pennines AONB Partnership's Northern Rocks Festival of Geology and Landscape (23 May - 7 June 2009)**

### Ladycross Quarry

The 44 Year 7 children started their day at Ladycross Quarry near Slaley, where North Pennines AONB Partnership Geologist Dr Elizabeth Pickett explained how the sandstone had been laid down more than 300 million years ago, formed from sand deposited as thin, level layers in vast river deltas. Quarry Manager and Owner Robin Turner said these flat slabs of sandstone were now quarried by hand to supply paving stones, roofing slates and cladding for some of the finest buildings in the country. Ian Hancock of the Friends of Ladycross Quarry was also on hand to tell the children about the work that had taken place to encourage wildlife such as birds, butterflies and dragonflies to make their homes on the site.

### Hike to the Engine House

Then the 11- and 12-year-olds set off on a 2.5-mile hike down to Blanchland, taking the route of an ancient drove road past Pennypie House and Shildon Engine House, where the North Pennines AONB Partnership's Community

Interpretation Officer Abi Wylde described how lead mining families would have lived and worked at Shildon 150 years ago.

### On to Blanchland

Finally at Blanchland, the children saw the rooftops that had been constructed using stone from Ladycross Quarry around 250 years ago, and Blanchland vicar Jim Lynch explained how monks had settled there centuries earlier and the shape of the village was based on the abbey they had founded.

### An invaluable event

Teacher Jacqui Cameron said the event had been invaluable in enabling the children to see at first hand how rock formed millions of years ago had influenced people's lives and the landscapes around them.

"It really helps the children put science, geography and history into context when they can see the stone being quarried, actually hold the fossils and minerals, and hear the stories of the buildings and how children their age lived in generations gone by."

Elizabeth Pickett said: "As well as being an enjoyable day out where they looked at different aspects of local life, the children can begin to make the connections between geology, industrial heritage and today's communities and landscapes."

The 2009 summer holidays are coming. Xingwen Geopark will launch a series of summer camp events for students at that time in order to enrich their life in the summer holidays and enable more students to understand geoheritage and grasp popularized knowledge of geosciences.

It is said that Xingwen Geopark has taken following actions for this summer camp and current summer tourist reception: examining tourist roads (routes) and service facilities; establishing a special work section for this summer camp; training 6 to 10 excellent tour guides in geosciences; and defining the ring route "fossil

## Summer Camp Events of Geosciences Education launched by Xingwen Geopark

Source: Xingwen geopark

labyrinth" and "Maogou Mountain" as the dedicated route of geosciences education. In this way, students can learn about more knowledge of geological structure in this summer camp.

To date, Xingwen Geopark has entered into the agreement with some middle schools and colleges in Sichuan Province. Plus, it has cooperated with some famed travel agencies in initiating publicity and team organization for this summer camp. Approximately 20 teams have registered for this summer camp up to now.

# Geopark conference success

Source: [www.thisissouthdevon.co.uk](http://www.thisissouthdevon.co.uk)

WILDLIFE experts and geologists have come from across the South West to attend a conference which promotes good practice in managing Torbay's wildlife and geology together.

The conference took place as part of the English Riviera Geopark festival thanks to the work on The Nature of Torbay, Torbay's wildlife and geology action plan.

Mel Border, co-ordinator of the English Riviera Geopark, said: "The festival is part of European Geoparks Week, an annual summer celebration to promote the geology and landscapes of the 34 UNESCO European Geoparks.

"The environment of the Bay is spectacular and this conference was a great opportunity for us to showcase how we are working together for the greater good of both our geodiversity and biodiversity." Alex Scholefield Torbay's biodiversity officer said: "The plan has been in action for two years now and it is incredible what we have achieved in the Bay in this time."

Cabinet member for community services and chairman of the Torbay Biodiversity Partnership, Cllr Dave Butt, said: "It was very enjoyable chairing such an informative conference in Torbay. The Bay's Geopark status puts us on the international stage as an important heritage destination."

Some 60 delegates met at the Riviera International Centre before taking a Geopark cruise to see for themselves some of Torbay's internationally renowned geology and range of wildlife.

14-16th September 2009

**2nd Circular**

## 8th European Geoparks Conference

### Organizers

The 8th European Geoparks Conference will be organized by Geopark Naturtejo and Idanha-a-Nova Municipality, with the support of the remaining Naturtejo municipalities: Castelo Branco, Nisa, Oleiros, Proença-a-Nova and Vila Velha de Ródão.

### Program

The 8th European Geoparks Conference will comprise general sessions and thematic oral sessions with invited speakers and selected oral presentations and poster sessions related to the main objectives.

	14th	15th	16th	17th
Morning	Opening of the registration desk	1st European Geoparks Tourism Fair/ Feira Raiana	Conference Work Sessions	Departure to the Field Trips
Afternoon		Conference Work Sessions	Conference Work Sessions	
Evening	Idanha Film and Internet Festival Medieval Ice breaker Dinner Public Opening of the 8th European Geoparks Conference/ Idanha Film and Internet Festival (Penha Garcia Ichnological Park)	Luisa Amaro Concert/Idanha Film and Internet Festival/ Feira Raiana	Idanha Film and Internet Festival: Castle Party/ Feira Raiana	

More information of 2nd Circular: [www.geoparknaturtejo.com](http://www.geoparknaturtejo.com)

## 1st European Geoparks Fair

Source: Geopark Naturtejo Meseta Meridional

The 1st European Geoparks Fair will coincide with the VIII European Geoparks Conference, to be held in Idanha-a-Nova in September 2009. This Fair brings to Idanha-a-Nova more than 20000 people from Geopark and surrounding

communities, the people from the Borderland. This will be the best time to try a "borrachão" and "jeropiga" with our people.

More information:  
<http://www.geoparknaturtejo.com/>



© Li Hui

Revalidation mission in Alxa Desert geopark



# Expedition to Alxa Desert Geopark by Geopark Experts

by Li Hui

Experts in geopark, Richard Watson and Pasquale Li Puma, as the representatives of GGN, made an expedition to Alxa Desert Geopark in Inner Mongolia, P.R.China during the period from June 23 to June 26.

According to the expedition procedure, Richard Watson and Pasquale Li Puma made a field investigation on lots of spots in this geopark, which included the Moon Lake Scenic Zone, main monuments and exhibition halls in Tengger Sub-Park, Haonuo Ergong Scenic Zone in Badain Jaran Desert Sub-Park, Yiker Aobao Bedrock Scenic Zone, Badan Lake Singing Sand Scenic Zone, Geopark Museum, Tourist Information Center, Rescue Station and Haisenchulu Wind Eroded Landform Scenic Areas, after listening to the report of application for admission to GGN from Alxa Desert Geopark and having a detailed review of all application materials thereof.

## Introduction to Alxa Desert National Geopark

The Alxa Desert National Geopark is the only National geopark of this kind in China, which systematically and completely shows various wind processes and its geoheritage types. This geopark covers an area of 630.37 km<sup>2</sup>, which is composed of three sub-parks —Badain Jaran, Juyan and Tengger Sub-parks, with a total of 10 scenic areas.

The Badain Jaran Sub-park is dominated by high sand hills

(megadunes), singing sands, lakes in desert and wind eroded landforms.

This sub-park is composed of four scenic areas—the Badain Jaran Desert, Mt. Mandela Rock Painting, Eribugai Valley and Haisenchulu Wind Eroded Landform Scenic Areas. The Tengger Sub-park is characterized by the various sand dunes, lakes in desert and valley landscapes, including three scenic areas—the Moon Lake, Tonghu Lake and Alunbulage Canyon Scenic Areas. The Juyan Sub-park is featured by the Gobi landscapes, primary Popular diversifolia Forest and ruins of ancient cities, including three scenic areas—The Juyan Lake, the Popular diversifolia Forest and the Black City Ruin Scenic Areas.

Being with abundant geoheritage types, amazing natural beauties and unique profound cultural history, the geopark is a natural museum to study the origin, development and evolution of deserts, and furthermore, it is a textbook to environmental conservation.

## Badain Jaran Sub-park

The Badain Jaran Sub-park is located in Alxa Youqi and consists of four scenic areas, they are: the Badain Jaran Desert, Mt. Mandela Rock Painting, Eribugai Valley and Haisenchulu Wind Eroded Landform Scenic Areas, covering an area of 410.67 km<sup>2</sup>. The sub-park owns the world's highest sand hill and largest singing sand area, which is called as a "kingdom of sounding sands"; The Haisenchulu Wind-eroded Landform Scenic Area is a typical area for

studying wind geological processes; The Mt. Mandela Rock Painting Scenic Area is reputed as an art gallery of the ancient culture in the northwestern China. The Museum of Alxa Desert National Geopark is the first museum of this kind which is built in desert area in China, which systematically displays the wind processes, arid eco-environment and culture. The Badain Jaran Sub-park is featured with peculiar desert landscapes and typical wind-eroded landforms. It's an ideal base for carrying out the ecotourism, scientific investigation and scientific popularization.

## Tengger Sub-park

The Tengger Sub-park, with an area of 131.5km<sup>2</sup>, is composed of three scenic areas, they are: the Moon Lake, Tonghu Lake and Alunbulage Scenic Areas. Being with various sand dunes, this sub-park is an excellent base for studying the origin, evolution and control of desert. The Moon Lake and Tonghu Lake areas are typical desert lake wetlands, and the Moon Lake is the desert tourist spot where is nearest to the metropolitans in China. The Alunbulage Canyon is a typical and rare canyon landform in the northern China formed in ancient red beds by the flowing water and wind processes. The precious geoheritage resources, unique religious culture and graceful natural landscapes make the Tengger Sub-park a significant geological popularization site and tourist resort.



## Juyan Sub-park

Covering an area of 88.2 km<sup>2</sup>, the Juyan Sub-park lies in Ejin and consists of four scenic areas. i.e., the Juyan Lake, Black City Ruin and Popular diversifolia Forest Scenic Areas. This sub-park has the vast Gobi, boundless desert, clean Juyan Lake, reputed Popular diversifolia Forest, mysterious Black City Ruin and the notable Dongfeng Space Center. Therefore, the Juyan Sub-park is a perfect combination of desert, Gobi, lake, Popular diversifolia Forest, historical relics and modern space technology.

## Museum of Alxa Desert National Geopark

The Museum of Alxa Desert National Geopark, with a construction area of 2,203 m<sup>2</sup>, was completed in September, 2007. Its outline is designed in the shape of sand dunes, the museum composed of the prologue hall, exhibition hall, resources hall, meeting hall, VIP hall, visitor center and the room for scientific popularization. Through a lot of ways, such as photos, interpretation, electronic equipment

display, interactive items and specimen exhibition, this museum is successful in displaying the various geoheritage types, natural beauties and unique cultural history in the geopark.

The major monument of the geopark is 20.07 m high, and the auxiliary monument is 16.09 m high, which looks like a graduated ruler. There is a square of the geopark covering an area of 53,000 m<sup>2</sup>. The Service Center covers a construction area of 1,864 m<sup>2</sup>, containing an Aid-Support Station and a Reception Center. This museum is well equipped and can provide services including accommodation, aid and support, tourism, restaurant and entertainment.

## Exhibition Hall and Information Center of Tengger Sub-park

The exhibition hall and information center of Tengger Sub-park in the Alxa Desert National Geopark is seated on the second floor of Bayanhot Stadium, which opened to the public on September 16, 2007. The exhibition hall is the microcosm of Tengger Sub-park, covering an area of 700m<sup>2</sup>, where visitors could

get to know the basic information and geological significance of the Tengger Sub-park. All exhibits fully demonstrate the geoheritage features, biodiversity, mineral resources and cultural relics in the Moon Lake, Tonghu Lake and Alunbulage Scenic Areas through the ways of photos, pictures and specimens.

## Exhibition Hall and Information Center of Juyan Sub-park

The exhibition hall and information center of Juyan Sub-park, established on September 18, 2007, is located in the Dalai Hub Town and covers an area of 266m<sup>2</sup>. It shows the geoheritage, cultural history and space technology in the different scenic areas in Juyan Sub-park in the way of pictures with corresponding interpretation, and provide related information about the sub-park to visitors.

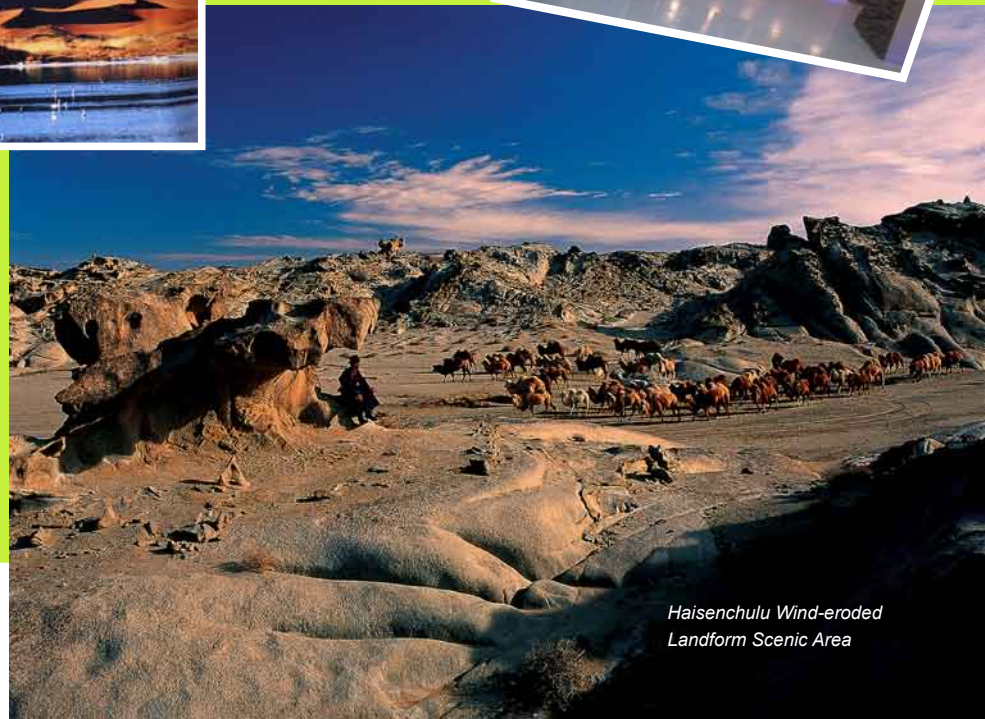
Badain Jaran Desert



Tengger Desert



Mt. Mandela Rock Painting



Haisenchulu Wind-eroded Landform Scenic Area



Alxa Desert Geopark Museum



On June 28, experts in geopark, Richard Watson and Pasquale Li Puma, started their second-station field expedition in China, i.e. Qinling Zhongnanshan Geopark in Shaanxi Province, after their field investigation on Alxa Desert Geopark was over.

© Li Hui

Experts listened to the work report from Qinling Zhongnanshan Geopark concerning its application for a global geopark over three days. They also inspected such scenic zones as Cuihua Mountain, Li Mountain and Taiping as well as Xi'an Museum of Natural History with emphases on the museum construction, indicative

## Expedition to Qinling Zhongnanshan Geopark by Experts

and explanatory plate construction, roads, tourist service facilities, application materials and other matters of the Geopark. Meanwhile, experts acquainted themselves with the history, culture and folk customs and practices of the place where the Geopark is located through the visit in Terracotta Warriors and Guanzhong Folk-custom Arts Museum. Moreover, they entered homes of local peasants to gain knowledge of the economic benefit and local living improvement resulting from the Geopark. Experts offered proposals for the future development of Qinling Zhongnanshan Geopark in conclusion. In their opinions, Terracotta Warriors and the Geopark

should be linked so effectively and closely that the tourism resources can be used to the utmost extent in view of the fact that Terracotta Warriors is an important tourism scenic spot under Qinling Zhongnanshan.



## Introduction to Qinling Zhongnanshan Geopark

Ancient pagoda in Xi'an



Stretching from east to west and located in central China, the Qinling

Mountains (Qinling Mts.) are one of typical continental composition orogenic belts in the world and represent the major amalgamation zone in China continent. Therefore, it has been an important natural boundary of geology, geography, ecology, climate and even culture between north China and south China. The Qinling Mts. possess the geological peculiarities out of the global common characteristics. Abundant, typical and integrated geological phenomena of the orogenic belt and basin-mountain structures in the Qinling Mts. have interested geologists at home and abroad. The Qinling Mts. have become an ideal laboratory for geoscientists and an excellent museum for tourists because the Qinling Mts. contain rich scientific information of modern geological frontier and numerous geological relics characterized by its long-evolved history, complicated tectonics, various rock types, splendid landscapes and abundant mineral resources. It is noteworthy



that the complete geological records generated during the plate collision and assembly between north China and south China have been well preserved, and moreover the northern foot of the Qinling Mts. where the Zhongnanshan Geopark is situated is an adjoining area between the typical orogenic belt and the rift basin. So, the Zhongnanshan Geopark certainly reflects the scientific contents of the orogenic belt and exhibits marvelous landscapes.

### Location of Zhongnanshan Geopark

Lying 25 km to south of Xi'an, the capital city of Shaanxi province, the Mt. Zhongnanshan is geographically located in the middle portion of the Qinling Mts. It falls in the region of 107°37'E-109°49'E and 33°41'N-34°22'N. The geopark covers an area of 6,638 km<sup>2</sup>, of which the major geological relics are about 2,184 km<sup>2</sup>. Based on geological and landscape features, the following five style parks have been recognized in the geopark. They are: the park of Mt. Lishan rift-horst tectonics; the park of Mt. Yushan arc-type granite ridge and peaks; the park of Mt. Cuihuashan slides; the



Revalidation mission in Qinling Zhongnanshan geopark © Li Hui



park of Mt. Bingjingding ductile shear zone and structural migmatites and the park of Mt. south Taibai suture zone and Quaternary glaciers.

## Type of Zhongnanshan Geopark

Tectonic—geomorphological type geopark

## Main geological relics of Zhongnanshan Geopark

Inside the geopark, relics of the orogenic belt, rift basins, basin-mountain structures and Quaternary geology are characteristic.

### 1. Orogenic geological relics

The Zhongnanshan Geopark greatly exhibits the characters of the Qinling orogenic belt. The major orogen-related relics include various strata, rocks and structures formed during the plate subduction, collisional orogenesis and intracontinental multi-phased tectonics. These relics can be mainly observed in the Mt. Yushan, Mt. Bingjingding and the Mt. southern Taibaishan.

Stratigraphical relics: the Danfeng group contains the relict early Paleozoic-Indosinian oceanic crust slices, arc ophiolite mélangé and sedimentary prime. Also, the strata of the Daogu basin strata and overlying intermountane basins as well as the rock records of the trough-arc-basin system of the Qinling orogenic belt are well preserved in the geopark.

Lithological relics: there are different types of rocks occurring in the different tectonic regimes. These rocks include intrusive, volcanic (sub-volcanic), metamorphic rocks and the combination of two different migmatites. The Paleozoic-Mesozoic magmatic rocks of basic-intermediate-acid types are extremely developed on both sides of the plate subduction-collision zone. The I-, S- and IS-type granites can also

be seen. The anatectic volcanics are new-phase eruptive rocks and sub-volcanic rocks (cryptoexplosive breccias) developed during the Mesozoic intracontinental orogenic processes.

Structure relics: the various types of subduction-collision orogenic structures and intracontinental orogenic structures, including deep rheological structures, ductile-brittle structures at medium-deep-medium-shallow levels such as compressional, extensional, shear, strike-slip faults and folds. There are also plenty of superimposed macro-micro structures as well as rift, basin-mountain and horst – grabens.

These typical geological relics completely record the evolution of the Qinling orogenic belt and the stratigraphical development, and provide evidence and materials for further study of the composition, structure and dynamics of the Qinling orogenic belt during multi-phased orogenesis.

### 2. Quaternary geological relics of mountain slide

The Mt. Cuihuashan has the third-largest post-Holocene mountain slide relics in the world. The volume of the mountain slide is about 300 million m<sup>3</sup> and in an area of 5.2 km<sup>2</sup>.

The biggest collapsed block is 89,640 m<sup>3</sup> and No.1 in size in China. Other geomorphological types, like mountain slide free-face, collapse accumulation, dammed lake and collapse cave can be seen here with complete appearances

#### Quaternary glacier relics

The Mt. Taibaishan (elevation: 3,767m) is the highest mountain in east China. It develops 10 to 100 thousand years old (named Taibai glacial age) glaciers. The well-preserved glacier relics of glaciated,



The Mt. Taibaishan

drift and periglacial landforms are definitely significant for study of paleoclimate change and paleoglaciation in the Quaternary in China, and in east Asia as well.

#### Lantian Ape Man site

In 1963, the Chinese Academy of Sciences discovered Lantian Ape and other 38 kinds of animals fossils including megalantereon, stegodon, sambar and leptobos which was named Lantian Gongwangling



Fossil of Lantian Ape

vertebrate fauna. The fossil of Lantian Ape skull found in the Gongwang hillside is as old as 1.15 million years, the Lantian Ape mandible in the Chenjiawozi village 750,000 years old, while the stone wares and tools unearthed in the Gongwang hillside is dated 1.327 million years.

#### Cenozoic fault relics

The Cenozoic great fault at the northern foot of the Qinling Mts. actually indicates the southern boundary of the Weihe rift. It was initiated in the early Cenozoic and has since then been activating. The fault plane of the fault is almost

vertical, its southern block (the Zhongnanshan mountain), also the footwall keeps moving up and the northern one (the Weihe basin), the hangingwall continues to go down. Based on the geological and borehole data, the vertical movement marked by the bottom of the depression of the Weihe basin and the planation surface on the top of the Taibaishan peak has been measured as 13 km since middle-late Cretaceous (ca. 100 million years). The present relative elevation from the Weihe basin to the top of the mountains has been around 3,000 meters. What a wonder! The east-west trending fault has now formed a series of fault facets and cliffs in the front of the mountains along which a number of hot springs are distributed.

The Henglingyuan, Bailuyuan, Shaolingyuan and Shenheyuan are in juxtaposition and tilted in east and dip west. They represent typical loess yuan landform formed under the control of the secondary faults in the Cenozoic Weihe graben basin. Their stretching is wave-like as look north from the Mt. Zhongnanshan.

#### *Horst block of Mt. Lianshan*

The Cenozoic Lianshan mountain horst type block structure--The Mt. Lianshan is a horst type block inside the Weihe graben basin featured by its steep northern fault and southward dip. As a result, its north side has uplifted and looks splendid.

### **Ecological and biological environment**

The southern slope of the Mt. Zhongnanshan belongs to the subtropical humid zone, and its northern slope is in the temperate subhumid zone. The Mt. Zhongnanshan also marks the northern limit for the evergreen broadleaf trees and subtropical plants. Zoogeographically, it lies in the transition area of the Oriental realm and the Palearctic realm in the world 6 animal faunas,

and adjoining area of the flora-fauna in north, central China, Tangute, and Hengduanshanmai regions. Here has a complete biological vertical lineage, which is the important gene storage of the warm temperate zone in east



Asia. Some rare animals such as panda, crested ibis, rhinopithecus, gold hair budorcas live and plants like kingdonia grow in the geopark.

### **Historical and cultural remains**

The special geological settings have enabled the uplift of the highest mountains in east China and the extensive development of the richly endowed Weihe basin. Tracing back to 1.327 million years ago, during the Old Stone Age, our ancestors had begun to live at the foot of the Mt. Zhongnanshan. Hence, this piece of land has initiated and cultivated the Chinese civilization. It is a place where human beings and nature have been harmoniously living together. Also here is a birthplace and cradle for Chinese poem and gardening culture. There are 12 national key cultural relics in the region, of which the Lantian Ape Man site, the Shangyu ancient path, the Ziwu plank road, the royal gardens and palaces of Zhou, Qin, Han and Tang Dynasties as well as a variety of temples and the Lantian jades are representatives of humanity civilization resources in the Zhongnanshan Geopark.



*Terracotta Warriors*

## **Isles make case for Geopark status to assessors**

*Source: [www.shetlandtimes.co.uk](http://www.shetlandtimes.co.uk)*

Shetland's bid to become part of the Global Geoparks network is well under way, and as part of the selection process two European assessors visited to determine whether the isles have what it takes to gain the coveted status.

Dr Marie-Luise Frey and Dr Babbis Fassoulas met with local communities and visited areas of geological interest before attending a civic reception at the Museum and Archives.

Speaking at the reception were local councillors Rick Nickerson, Bill Manson and Jonathan Wills, who in their short speeches summed up the importance of geology to Shetland in a wide range of areas, including heritage and culture, education and economics and tourism.

Mr Nickerson said that the importance of geology to Shetland's people throughout the ages could not be underestimated, influencing things from bird species through to place names. The possibility to become part of the Geopark network would be, he said, "the last piece in a fantastic story".

Dr Wills pointed out the importance of Shetland's environment to tourism, emphasising that around three quarters of visitors to Shetland come to the isles for the environment. He gave praise to the work of Rubina Barton in getting Shetland's Geopark bid to this point and said he was "very much looking forward to hearing the verdict".

There are currently 58 Geoparks, in 18 member states. As part of Shetland's bid to become a part of this network of geological heritage spots, the Shetland Amenity Trust and Geopark Shetland Working Group have developed projects to protect and promote Shetland's heritage and

culture.

Some of these include self guided trail leaflets, the installation of 52 interactive panels at specific geological sites of interest around Shetland, installation of "geo-art" and the restoration of the Hagdale Horse Mill, which is the last surviving mill of its kind in the UK.

The results of the assessors' findings on Shetland's requirements are to be presented to a committee, which will then make the decision on whether the isles are to be included. This will be announced in September.

## Achievements of Geopark Shetland Project

Source: [www.geoparkshetland.org.uk](http://www.geoparkshetland.org.uk)



### Public Awareness

Since the Geopark Shetland Working Group (GSWG) was established in 2004, Geopark Shetland Project has continually raised awareness of Shetland's geology and kept the public informed of Shetland's Geopark bid in various ways:

- § Annual programmes of talks, presentations and workshops on Shetland's geology and the Geopark bid.

- § Articles on Shetland's geology in local and national publications.

- § Coverage of Geopark Shetland Project activities in local press.

- § Attending local fairs and open days, such as the environment and science fairs.

- § Holding short courses on Shetland's geology.

### Project Development

Established in 1983, Shetland Amenity Trust (SAT) has managed a number of projects related to Shetland's heritage and culture, including its geological heritage. Since the establishment of the GSWG many projects related to Shetland's geological heritage have been driven forward.

### Achievements Include

2009

- § European Geopark assessors visit. This is the final stage in the European Geopark application. We will find out if Shetland has achieved European Geopark status in September.

- § Launch of the first in a series of self guided trails. 'Shetland's Volcano' takes visitors on a tour of Northmavine's volcanic past.

- § Launch of the Geopark Shetland Project website.

2008/2009

- § Development and installation of a series of 52 interpretive panels at sites of interest throughout Shetland, including 17 panels with geological interpretation.

2008

- § 2nd European Geopark application submitted, resulting in Shetland progressing to the next stage - an assessor's visit.

- § Installation of Geoart exhibits at Stenness and Braewick.

- § Restoration of the Hagdale Horse Mill, the last surviving example of a mill of its kind in the UK.

- § Creation of geological walls on Fetlar and at Mavis Grind, which introduce visitors to the rocks and geological features of the area.

- § Survey of all Shetland schools carried out to assess current educational initiatives and where Geopark Shetland Project could enhance geology and earth science education.

2007

- § SAT appointed a Geology Project Officer, to act as a project coordinator, develop the Geopark application and liaise with European Geoparks Network.

- § Shetland geology leaflet developed as part of a suite of 30 thematic and geographic interpretive leaflets.

- § SAT opened the Shetland Museum and Archives. Find out more about this attraction on our places to visit page.

2005-2006

- § The GSWG established a political will and community support to use Shetland's geology as a driver for developing sustainable Geotourism and for Shetland to become a member of the European Geoparks Network, including:

- Unanimous approval of these aims at a full Local Authority council meeting.

- Majority approval at six public meetings held in strategic locations throughout Shetland.

- A number of letters of support from various internal and external organisations.

### Geopark Conferences

Members of the GSWG have attended the annual European Geoparks Conference since 2005, often giving presentations on Shetland's geology and Geopark Shetland Project to the delegates.

