

## World Heritage Sites

### Protected Areas and World Heritage



## MOUNT SANQINGSHAN NATIONAL PARK CHINA

*A undisturbed forested granite massif with a mass of fantastically shaped pillars and peaks, and rocks evidencing a billion years of the earth's history from before the pre-Cambrian appearance of multicelled life onwards; also a Mesozoic subduction of continents and the emplacement of granites later three times uplifted then eroded to become the present forest of pinnacles. Many relict, rare and endangered plants and animals, including plant genera now known only in unglaciated parts of China and North America.*

### COUNTRY

China

### NAME

Mount Sanqingshan National Park

### NATURAL WORLD HERITAGE SITE

2008: Inscribed on the World Heritage List under Natural Criterion vii.

### STATEMENT OF OUTSTANDING UNIVERSAL VALUE

The UNESCO World Heritage Committee issued the following Statement of Outstanding Universal Value at the time of inscription:

#### Values

Mount Sanqingshan National Park displays a unique array of forested, fantastically shaped granite pillars and peaks concentrated in a relatively small area. The looming, intricate rock formations intermixed with delicate forest cover and combined with ever-shifting weather patterns create a landscape of arresting beauty.

**Criterion (vii):** Superlative natural phenomena or natural beauty: Mount Sanqingshan's remarkable granite rock formations combine with diverse forest, near and distant vistas, and striking meteorological effects to create a landscape of exceptional scenic quality. The most notable aspect is the concentration of fantastically shaped pillars and peaks. The natural beauty of Mount Sanqingshan also derives from the juxtaposition of its granite features with the mountain's vegetation enhanced by meteorological conditions which create an ever-changing and arresting landscape. The access afforded by suspended walking trails in the park permits visitors to appreciate the park's stunning scenery and enjoy its serene atmosphere.

#### Integrity

The park boundaries are appropriately drawn to protect the naturalness of the landscape and the areas required to maintain the scenic qualities of the property. The property, although relatively small, includes all of the granite peaks and pillars which provide the framework for its aesthetic values. Boundaries are accurately surveyed and demarcated. The property's integrity is enhanced by the designation of a buffer zone that is not part of the inscribed property.

#### Protection and Management Requirements

The property has effective legal protection, a sound planning framework and is currently well managed. The park benefits from strong government support and funding. The park's natural resources are in good condition and threats are considered manageable. There is an effective management regime in place for the park. The key requirement is to manage the property to retain its aesthetic values, and a delicate balance will need to be maintained with the provision of visitor access. The most significant threat relates to the future increase in tourism, and careful and sensitive planning of the related infrastructure and access development is required.

### IUCN MANAGEMENT CATEGORY

II National Park

## **BIOGEOGRAPHICAL PROVINCE**

Oriental Deciduous Forest (2.15.6)

## **GEOGRAPHICAL LOCATION**

Situated in northeastern Jiangxi province, central east China, 430 km southwest of Shanghai, between 28°48' to 29°00'N and 117°58'E to 118°08'E, centred on 28°54'57"N x 118°03'52"E.

## **DATES AND HISTORY OF ESTABLISHMENT**

- 1984: Shangrao Regional Committee set up a team to manage Sanqingshan Scenic Area;
- 1988: National Park established by the State Council of China;
- 1996: Management Committee for Mt.Sanqingshan set up from representatives of the provincial departments of six ministries and the Shangrao municipal government;
- 2003: General land-use plan issued by the Management Committee;
- 2004: Core area plan by the Management Committee on Scenic Spots;
- 2005: Designated a GeoPark by the Ministry of Land and Resources;
- 2006: Inscribed on the List of National Natural Heritage by the Ministry of Construction;  
Management regulations for the National Park promulgated by Jiangxi Provincial authority.

## **LAND TENURE**

State, Management is by the Mt. Sanqingshan Management Committee under the Shangrao Municipal Government and the Jiangxi Provincial Department of the Ministry of Construction.

## **AREA**

Nominated core zone: 22,950 ha, coincident with the National Park. Buffer zone: 16,850 ha.  
Central Strictly Protected Area: 2,800 ha.

## **ALTITUDE**

-200m to 1,816.9m (Yujing Peak)

## **PHYSICAL FEATURES**

Mount Sanqingshan is at the western end of the Huaiyu Range. It is a massive uplifted pluton of deeply faulted and dissected granite, which forms an island of temperate forest above the subtropical countryside. The central massif of Yujing (1817m), doubly uplifted in the late Cenozoic within a bordering triangle of faults, dominates a fragmented network of joints in the batholith resulting from past expansion of the crust. The eroded blocks were further split horizontally into cliffs and clusters of sharp-edged, rounded and sculpted pillars which were never later glaciated, resulting in a forest of pinnacles. The granite core is bounded on the northwest by dolomite, on the northeast and southeast by calcified shale, the southeast also being crossed by bands of limestone and karst. The Sanqingshan granites are notable for the compact occurrence of three different types of granite formed at different levels in the crust in two emplacements in the late Cretaceous which chart past crustal movements and the development of magmatic intrusions. They are of ultra acidic and highly silicic fine to medium-grained porphyroid biotite surrounded by a belt of coarse-grained granite. The warm humid climate promotes erosion, but uplift has outpaced denudation. The 23 main valleys above 500m are V-shaped gorges. There are many streams, waterfalls, lakes and springs, and a central 2,800 ha core has 48 peaks and 89 sculpted pillars ('pictographs') of unequalled density and diversity of form. The predominant grey-yellow soils are light-textured and acidic.

The geology of the area is very complex and only recently examined in depth. Its rocks give evidence of nearly a billion years of earth's development reaching back to the late pre-Cambrian Neoproterozoic era (1000-542 mya) when the super-continent of Rodinia (1100-750mya) and the first multicellular life appeared. This continent formed from the movement of tectonic plates around the earth, and during the Cryogenian period (750-700mya) was glaciated at the equator shown by deep deposits of till and visible glacial striations. At the time the site was an island arc in a fracture zone between two plates, the Yangzi and Cathaysian, which collided to form Rodinia. Evidence for this exists in 900 million year old ophiolites (oceanic mantle rocks) and schist obtruded into the rift. Rodinia broke up accompanied by still evident volcanism and the rift became an ocean. Here in the early Cambrian (c. 540-520) thick black mineral-bearing shales, carbonate and calcareous sediments and thin coal beds were deposited. There followed both a major die-off, then an explosion of life (brachiopods, ammonites). Ordovician

shales rich in graptolite fossils formed and are exposed in stratigraphic sections which have yielded 51 genera and 247 species and subspecies, one and 21 respectively being new to science. Subsequent tectonic plates fused in the South China continent which was successively uplifted, levelled and sunk undersea, processes all legible in the existing rocks. In the Jurassic period intracontinental subduction of the Eurasian plate beneath the paleo-Pacific plate, and extension of the crust, led to the emplacement of the Sanqingshan granites and the rise of the Huaiyu range in the Yanshanian orogeny. The granites were exposed by continual erosion and by several uplifts, recorded in the landscape in three stepped erosion surfaces, at 900m, 1200m and 1500m which with their forests of pillars make this the most spectacular granite landscape in China.

## CLIMATE

The climate is a combination of subtropical monsoon and maritime influences, varying with altitude. There are four distinct seasons: a cold and rainy spring, a hot and rainy summer, a dry autumn and a cold humid winter when mountaintops may be snow-covered. The annual average temperature is 10.9°C, the average in July is 21.2°C and the maximum, 33°C; the average minimum temperature in January is -16°C. The annual average rainfall is 1857.7mm and annual evaporation, 1331.6mm. The average relative humidity is 82%. The mountain's meteorological effects are notable: light refraction can produce bright halos on clouds and white rainbows in foggy air. Seen from above, the cloud seas and falls over ridge crests are striking. Mists are common and the strange shapes of the towering fingers of rock when wreathed in mist make this an unusually fantastic landscape.

## VEGETATION

Mount Sanqingshan is within the Sino-Japanese deciduous forest realm. It rises from warm temperate evergreen broadleaf and coniferous foothill forest to low coppice woodland on the summit, an island of temperate montane vegetation in a subtropical setting. The dominant association is broadleaf forest over 50% of the site, and which with three other closely associated forest types, covers 95%. Species come from a wide range of biomes: 18.4% of the total are northern temperate species, 14% east Asian, 13% Pan-tropical, 9.4% disjunct, 9% tropical Asian, 7.4% Old World temperate and 5.9% cosmopolitan. Tropical species shared with the old world, America, Africa and Australia make up 15%. The site has 2,373 species in 984 genera and 253 families, including 1,802 angiosperms, 24 gymnosperms, 179 pteridophytes and 368 bryophytes. 300 vascular plants in 21 genera are endemic to China; 14 angiosperms, 12 gymnosperms and 3 ferns are endemic to the mountain. 55 species are considered rare; 11 are said to be globally threatened and 11 are relict. 11 Euphorbiaceae and 81 orchids are listed by CITES. The most threatened species on a global scale include *Acer buergerianum* (CR ?), maidenhair *Ginkgo biloba* (EN) and *Pseudotsuga chienii* (EN). The mountain is part of the world dispersal centre for *Pseudotsuga* and *Tsuga* species.

There are nine types of vegetation on the mountain. Evergreen warm temperate broad-leafed forest covers over half the site between 300m and 1,000m; dominant species are *Castanopsis sclerophylla*, *C. eyrei*, *C. tibetana*, *Cyclobalanopsis glauca*, *Schima superba*, *Machilus thunbergii*, and *M. chinensis*. Warm temperate coniferous forest covers a fifth of the site from 200 to 800m and the two types mixed together, cover a seventh of the site between 200m to 800m; dominant species are *Pinus massoniana*, *Cunninghamia lanceolata*, *Castanopsis sclerophylla*, *Liquidambar acalycina*, *Alniphyllum fortunei*, *Sassafras tsumu*. A tenth of the site between 1,000m and 1,800m is in temperate needle and broadleaf forest; dominant species are *Rhododendron simiarum*, *Pinus taiwanensis*, *P. gausсенii*, *Tsuga chinensis* var. *tchekiangensis*, *Pseudotsuga chienii*, *Torreya grandis*. Together the four forests clothe most of the mountain. There are much smaller areas of five other vegetations. Small dense warm temperate forests of the uncommon conifers *Pinus taiwanensis* and *Pseudotsuga gausсенii* grow between 600m and 1,800m, many around the ancient Sanqingshan temple. Some of the pines are 1,000 years old and the *Pseudotsuga* is a nationally preserved species. Evergreen and deciduous broadleaf forest grows from 700m to 1,000m. Bamboos of three species grow at three different levels between 200m and 1,700m. Coppice forest grows at 1,000m and mountaintop meadow with coppice grow above 1,500m. There are three greatly valued tree *Rhododendron* species, some said to be a 1,000 years old, with trunks of 25-20cm diameter and growing 5-6m high. China was one of the main biotic refuges during the last Ice Age. 68 genera found on Sanqingshan are geographic relics closely related to those of southeastern and western North America, though the shared taxa are still disjunct. Examples are *Magnolia*, *Torreya* and *Liriodendron*, of which latter there is one species on each continent. The pattern dates back to the late Cretaceous when the Bering land bridge still existed, suggesting a primordial geological relationship.

## FAUNA

70% of Sanqingshan's animal species are from the Oriental Realm, 39% from the Palearctic. Vertebrates total 401 species: 67 mammals, 226 birds, 23 amphibians, 49 reptiles and 36 fish. The total of invertebrates recorded is 1,327. 23 species found on the mountain are listed as globally threatened and at least 37 species are endemic to China: 6 mammals, 9 birds, 7 reptiles, 3 amphibians, 3 fish and 9 butterflies. The 67 mammals come from 22 families. Among them are Chinese pangolin *Manis pentadactyla* (EN), Malayan porcupine *Hystrix brachyura*, rhesus macaque *Macaca mulatta*, Pere David's macaque *M. thibetana*, Asiatic wild dog *Cuon alpinus* (EN), Himalayan black bear *Ursus thibetanus* (VU), clouded leopard *Neofelis nebulosa* (VU), leopard *Panthera pardus*, Asiatic golden cat *Pardofelis temminckii*, Chinese leopard cat *Prionailurus bengalensis chinensis*, large Indian civet *Viverra zibetha*, small Indian civet *Viverricula indica*, tufted deer *Elaphodus cephalophus*, Chinese water deer *Hydropotes inermis* (VU), black muntjac *Muntiacus crinifrons* and serow *Capricornis sumatraensis* (VU). Most of the rarest species are found higher on the mountain.

Out of a total of 226 birds from 55 families, four are globally threatened: Chinese merganser *Mergus squamatus* (EN), greater spotted eagle *Aquila clanga* (VU), brown-chested jungle flycatcher *Rhinomyias brunneata* (VU) and Cabot's tragopan *Tragopan caboti* (VU). The nomination document lists 42 rare species which includes 17 species of raptor, 10 species of owl; mandarin duck *Aix galericulata*, crested serpent-eagle *Spilornis cheela*, Elliot's pheasant *Syrnaticus ellioti*, koklass pheasant *Pucrasia macrolopha*, redbilled leiothrix *Leiothrix lutea*, Chinese hwamei *Garrulax canorus* and yellow-throated laughing thrush *G. galbanus*. The 16 rarest reptiles include big-headed turtle *Platysternon megacephalum* (EN), Chinese pond turtle *Chinemys reevesii* and *Pelodiscus sinensis* (VU). The list of rare species also includes the frog *Hoplobatrachus rugulosa* and the golden kaiserhind butterfly *Teinopalpus aureus*, one of 180 species of butterflies in 113 genera and 11 families, including 25 Papilionidae.

## CONSERVATION VALUE

A little-disturbed steep forested granite massif with a mass of fantastically shaped pillars and peaks, with rocks evidencing the break-up of Rodinia, a pre-Pangean supercontinent during the Proterozoic period 1000-542mya, the Cryogenian period of worldwide glaciation 850-630mya just before the earliest fossils of multicelled life in the late pre-Cambrian 630-542mya, the lower Paleozoic explosion of life, Mesozoic intracontinental subduction and emplacement of granite bodies, late Cretaceous crust extension and ongoing deep dissection along a network of vertical and horizontal joints. Many relict, rare and endangered plants and animals including plant genera now known only in unglaciated parts of China and North America, indicating a past geological connection.

## CULTURAL HERITAGE

The ancient religion of Taoism is based on the worship in and of nature. Sanqingshan has been a Taoist shrine since a priest, Ge Hong, came to the mountain 400 years ago. At 1,530m high in the heart of the mountain stands the large Sanqingshan temple, the Dragon and Tiger temple, named for its carvings and the Ming period Wind and Storm pagoda. A small Taoist population settled 300 years ago in the surrounding valleys, each village adopting traditional rules to protect its surroundings. The mountain's modern conservation, which started in about 1980, is founded on a similar attitude.

## LOCAL HUMAN POPULATION

The mountain itself is too steep and remote for settlement but the surrounding farmed valleys have recently drawn more incomers and within the buffer zone there are now 5 towns and 15 villages. The population of the core zone is 5,790 and of the buffer zone, 23,598.

## VISITORS AND VISITOR FACILITIES

In 1998 there were 3,700 visitors; by 2004 despite its remoteness from good public transport, the number was 298,000. The tourist facilities are ample. 50 kilometres of trails are maintained, including a cliffside sky-path, 100 designated scenic spots periodically closed to rest them from overuse, with 256 information panels. 361 notable landforms are listed. There is a tourist service centre, 135 tour guides, safety inspectors, sedan chair bearers, 50 toilets and within the Park, 6 restaurants, 5 shops and parking. A museum and an entrance reception centre are being built. There are ample beds, restaurants and hospitals in the area. 160 books and brochures and 12 broadcast video programs have been published.

## SCIENTIFIC RESEARCH AND FACILITIES

The geological history of the site recorded in its rocks has been closely examined for some 25 years and discoveries such as that of the ophiolite occurrence, are still being made. The rocks are especially useful for their combination of complexity and compactness, forming a natural laboratory for examining the past. The formation and emplacement of the granites and the interpretation of primordial continental movements have been studied in depth. Many local institutions continually monitor aspects of the site, and foreign experts often attend meetings, come as consultants and to train personnel in heritage management. Over 300 papers on the geology and ecology of the area have been published.

## MANAGEMENT

The National Park is managed by the Mt. Sanqingshan Management Committee for Shangrao Municipal Government and the Jiangxi Provincial Department of the Ministry of Construction. Protective regulations imposed by the state, the province and the municipality are enforced and a land use plan and a core area plan have been drawn up by the Management Committee for Scenic Spots. A Conservation and Management Plan was drawn up in 2006 for the protection of the scientific, scenic and biotic values of the Park. There are four protective zones. Special Grade Protection Area (*Pinus* and *Tseudotsuga* forests): tourists and construction are excluded. Grade I Protection Area (Geological landscape): walkways but few facilities; Grade II Protection Area: limited accommodation and restaurants; Grade III Protection Area: controlled development permitted. Tree felling, unlicensed specimen collection, agriculture, quarrying, hunting and alien plant introduction have been forbidden since 1988. The present state of conservation is good, partly due to its remoteness and inaccessibility. There has been some restoration of marginal farmland to forest of native species. Fire prevention and the elimination of forest pests have been successful. Construction is only by permit and tourist numbers are monitored and limited to 7,400 per day, with a waste disposal system to match. Monitoring is done a regular schedule of plants, alien species, wildlife, environmental quality, the water regime, village populations and land use and tourist activities.

## MANAGEMENT CONSTRAINTS

Landslides and mudslides occur but are controlled. Quarries still existing in the buffer zone are being closed and the sites rehabilitated. There have been no fires for 17 years and the forest is healthy though with climatic warming insect damage to trees may increase. Otherwise, the main pressure comes from increasing tourism which can affect water quality and impinge on village life. Some scenic areas are overcrowded during holidays and are sequentially rested.

## COMPARISON WITH SIMILAR SITES

The main bases for comparison with similar existing World Heritage reef sites are:

- (vii) Its concentration of forested fantastically shaped vertical formations and is a highly scenic example of columnar dissection of a faulted granite batholith;
- (viii) The record of geological history from a totally glaciated preCambrian supercontinent and earliest remains of multicelled life through Mesozoic intracontinental subduction and the emplacement of three closely occurring diagnostic granite bodies, to later Cretaceous crustal expansion, uplifts and erosion. It is a natural laboratory which has inspired a high level of research;
- (ix) Its relatively undisturbed mountain forest preserved by inaccessibility, a Taoist respect for nature, and careful management. Includes an original centre of geologically related disjunct species.

There are 57 mountain World Heritage sites. Comparable sites on the list which are granite, in the same or similar warm temperate forest biome, scenic and having notable tectonic and structural features are relatively few, and none have this combination of complex tectonic features in so compact an area yielding so much evidence of the geological past. Compared with these sites Sanqingshan is in the top 40% for diversity and density of listed species, with a high number being endangered. The measures of its undoubted intactness, scenic quality and endemism are not conclusive enough to give an objective record, but these are all high. The unusual aspects of its flora derive from its role as a refuge for disjunct much older forms, a trait shared with Mount Emei and the Great Smoky Mountains in North America, but these are on sedimentary rock as are the predominantly coniferous Redwood Park in California and Olympic Park in Washington state. Garajonay on La Gomera in the Canary Islands is on volcanic rock. The Atlantic Forests of Brazil, Blue Mountains and Central Eastern Rainforests of Australia are in similar latitudes in the south but on different bedrocks. Kinabalu is granite but tropical.

Mountain sites in the same Oriental Deciduous Forest biome are the granite Huangshan, a rival in scenic quality, the island of Yakushima, Shirakami-Sanchi which is almost all beechwood, and the richly diverse partly granite Mount Wuyi. Further sites in the same biome are the very scenic South China Karst and Wulingyan sandstone karst with their forests of stone pillars, the extensive and biodiverse Giant Panda Sanctuary, the limestone valleys of Jiuzhaigou and Huanglong, Mount Emei and Wulingyan, but these are all on sedimentary rock. Other sites of granite or granite mixed with other rocks include the glaciated pluton of Yosemite, half granite Pirin in Bulgaria, the high Western Caucasus range and the incomparably vast glacial to tropical Three Rivers of Yunnan.

## STAFF

There is staff of 242, covering all aspects of the National Park. Training programs, lecture courses and onsite training are constantly used.

## BUDGET

Between 1990 and 2005 the central and local governments and the park management contributed 1,670,000,000 RMB (US\$220,418,000) to the Park's funding, 80% coming from the state. In 2005 45,000,000 RMB came from revenue, 408,000,000 from investment (fixed assets) and 4,690,000 in subsidy, totalling 457,690,000 RMB (US\$60,409,000).

## LOCAL ADDRESSES

Ministry of Construction of People's Republic of China, 9, Sanlihe Road, Beijing, China.

Management Committee of Sanqingshan National Park, Sanqingshan, Shangrao City, Jiangxi, China.

## REFERENCES

The principal source for the above information was the original nomination for World Heritage status.

Bouffard, D. & Spongberg, S. (1983). Eastern Asian - Eastern North American phytogeographic relationships. A History from the time of Linneus to the twentieth century. *Ann. Missouri Bot. Gard.* 70: 423-439.

Charvet, J. *et al.* (1996). The building of South China: collision of Yangzi and Cathaysia blocks, problems and tentative answers. *Journal of Southeast Asian Earth Sciences*, 13 (3-5): 223-235.

Dingwall, P., Weighell, T. & Badman, T. (2005). *Geological World Heritage: A Global Framework*. IUCN, Gland, Switzerland.

IUCN (2008). *The Red List of Threatened Species*. IUCN, Gland, Switzerland & Cambridge, U.K.

Li, Z. *et al.* (1999). The break-up of Rodinia: did it start with a mantle plume beneath South China. *Earth and Planetary Science Letters*, 173:171-181.

Management Committee of Mount Sanqingshan National Park / Institute for Urban & Rural Planning & Design of Jiangxi Province (2006). *Conservation and Management Plan of Mount Sanqingshan National Park*

Ministry of Construction, Peoples Republic of China (2006). *World Heritage Convention Natural Heritage: China. Mount Sanqingshan National Park*. Nomination for World Heritage Status. Ministry of Construction, Beijing. [Contains a bibliography of 160 references]

Thorsell, J. & Sigaty, T. (1997). *A Global Overview of Forest Protected Area on the World Heritage List*. IUCN, Gland, Switzerland.

Zang, M. & Tang, C. (2000). On the Gymnospermae flora and the main point protected species of Mount Sanqingshan. *Journal of Shangrao Teachers College*. 20(6): 65-68.

Zang, M. & Bian, X. (2003a). Investigation on angiosperm plants in Mount Sanqingshan, Jiangxi Province. *Semitropical Plant Science*. 32(3):38-4].

----- (2003b). A study on the rare and threatened plants in Mount Sanqingshan, Jiangxi Province, *Journal of Wuhan Botanical Research*, 21(6): 515-520].

**DATE**

August 2007, 7-2008, May 2011.