ASIA / PACIFIC

SOUTH CHINA KARST (PHASE II)
(Extension of the “South China Karst”)

CHINA

WORLD HERITAGE NOMINATION – IUCN TECHNICAL EVALUATION

SOUTH CHINA KARST (PHASE II) (CHINA) – ID No. 1248 Bis

IUCN RECOMMENDATION TO WORLD HERITAGE COMMITTEE: To approve the extension under natural criteria.

Key paragraphs of Operational Guidelines:
Paragraph 77: Nominated property meets World Heritage criteria.
Paragraph 78: Nominated property meets integrity or protection and management requirements.

Background note: This nomination of Phase II of the South China Karst (SCK) seeks to extend Phase I of the property which was inscribed under criteria (vii) and (viii) in 2007 (Decision 31 COM 8.B11). At the time of the first inscription of SCK the World Heritage Committee recommended that the State Party consider this as Phase I of a larger World Heritage nomination, and consider whether the extent of subsequent phases of the entire series could be rationalized into a smaller number of sites and a single phase of nomination rather than two phases. The Committee added that the potential application of criterion (ix) should be considered in relation to the entire series that is eventually proposed. The Committee also recommended a number of other actions to the State Party including review of the boundaries of the (Phase I) Wulong cluster; continued efforts to manage catchment areas with the potential to impact on karst values; continued efforts to positively engage local people in management and future additions to the site; and urging transnational collaboration with Viet Nam on karst systems.

1. DOCUMENTATION

a) Date nomination received by IUCN: 20 March 2013

b) Additional information officially requested from and provided by the State Party: Following the technical evaluation mission the State Party was requested to provide supplementary information on 13 December 2013. The information was received on 21 February 2014.

c) Additional literature consulted: Various sources listed in the nomination, and in the earlier IUCN evaluation report, including Ford and Williams (2007) **Karst Hydrology and Geomorphology**. IUCN (2008) **World Heritage Caves and Karst – A Thematic Study,** IUCN World Heritage Studies No. 2. Palmer (2007) **Cave Geology.** Woo (2005) Caves – **A Wonderful Underground**.

d) Consultations: 22 desk reviews received. The mission also met with elected officials and senior representatives including the Institute of Karst Geology; Chinese Academy of Geological Sciences; Southwest University; Guizhou Normal University; the Chongqing Municipal Government; the Jinfoshan Management Committee; the People's Government of Guizhou Province; the Bureau of Tourism Development and Scenic Resources Management of Southeast Guizhou Autonomous Prefecture; the Committee of Huanjiang Maonan Autonomous County; the Mayor of the People's Government of Guilin City; the Department of Housing and Urban-Rural Development of Guangxi Zhuang Autonomous Region; the Management Administration of Lijiang National Park; the Chinese National Commission for UNESCO; the Division of WH and Scenic & Historic Areas Management, MoHURD; and many other stakeholders.

e) Field Visit: Les Molloy and Kyung Sik Woo, 20-31 August 2013

f) Date of IUCN approval of this report: March 2014

2. SUMMARY OF NATURAL VALUES

The nominated area for Phase II of the South China Karst (SCK) covers a nominated property of 49,537 hectares (ha) with buffer zones of 77,800 ha which are not part of the nominated area. Phase II of the SCK includes five separate components in four clusters across three Provinces. The State Party has advised, in February 2014, of a modification to the boundary of the Lijiang component within the Guilin Karst cluster. This increased the nominated area of the Lijiang component from 13,910 ha to 22,544 ha. Table 1 shows the relationship of SCK Phase I and Phase II areas. The nomination of these additional areas if inscribed would contribute to an overall SCK serial property of 97,125 ha with a total buffer zone of 176,228 ha compromising twelve components across four Provinces.

Table 2 shows the configuration of areas nominated as SCK Phase II which is the subject of this evaluation.

South China Karst Phase	Nominated property (ha)	Buffer Zone (ha)	Serial configuration
SCK Phase I	47,588	98,428	7 components in 3 Provinces (Yunnan, Guizhou, Chongqing)
SCK Phase II	49,537	77,800	5 components in 3 Provinces (Guizhou, Guangxi, Chongqing)
Total area (ha)	**97,125**	**176,228**	**12 components in 4 Provinces (Yunnan, Guizhou, Chongqing, Guangxi)**

Table 1: Relationship of SCK Phase I to Phase II areas.

Name of the site	County and province		Core zone (ha)	Buffer zone (ha)
Jinfoshan Karst	Nanchuan District, Chongqing City		6,744	10,675
Shibing Karst	Shibing County, Guizhou Province		10,280	18,015
Huanjiang Karst	Huanjiang Monan Autonomous County, Guangzi Zhuang Autonomous Region		7,129	4,430
Guilin Karst	Guilin City, Guangxi Zhuang Autonomous Region	*Putao Fenglin Karst Section*	2,840	21,610
		Lijiang Fengcong Karst Section	22,544	23,070
Total area (ha)			**49,537**	**77,800**

Table 2: Name and areas of the SCK Phase II nominated core zones and their surrounding buffer zones.

The region of South China (including territory of both China and in neighbouring countries) has one of the largest karst areas in the world, extending continuously over about 550,000 km^2 and recognized as one of the great karst regions in the world, and certainly in the tropics and sub-tropics. It also serves as the type locality for two globally significant karst landforms – fengcong and fenglin. Fengcong is an extensive limestone landscape made up of conical peaks separated by irregular depressions and valleys. Rates of limestone solution are enhanced by tropical and sub-tropical vegetation and abundant rainfall. Drainage is thus entirely underground, caves can occur at several levels and these can feed large springs. Where large rivers intersect this karst, basal corrosion and cliff collapse produce steep-sided, tall karst towers termed fenglin.

The karst terrain displays a geomorphic transition as the terrain gradually descends about 2000m from the western Yunnan-Guizhou Plateau to the eastern Guangxi Basin. The existing SCK sites together with the currently nominated extension track the evolution of karst development from the high inland plateau of Yunnan, where ancient karst remains almost undissected, to the lowlands of Guangxi where karst landforms can be seen in their final stages of evolution as isolated karst towers on corrosion plains.

The Guilin Karst has been developed in massive Devonian limestone which has been folded. Differential tectonic processes combined with allogeneic (rainfed) water input and special hydrological conditions in a humid climate provide excellent conditions for the formation of various karst landforms. The area is characterized by fenglin (tower karst) as well as fengcong (cone karst) landforms. Because of differential tectonic movements and associated contrasting hydrogeological conditions, fenglin karst was able to develop where the water table was shallow, while fengcong developed where the water table was deeper. Guilin karst illustrates the on-going process of fenglin karst development, and also strong evidence to show that fengcong relief and fenglin relief can develop simultaneously. Guilin Karst represents the near end stage of geomorphological evolution of karst in a humid tropical to subtropical environment. Guilin Karst is widely acknowledged as having the world's best expression of a tower karst landscape and has been internationally recognized as the type-site of continental tower karst. Due to its scenic quality the Guilin Karst is an extremely popular tourist attraction in China.

The Shibing Karst is a spectacular and very unusual fengcong karst with gorges developed in pure, thick and ancient dolomite rocks. The area displays strong karst development in a mid-subtropical karst gorge area with deep river incision. The area demonstrates that relatively insoluble dolomite can also develop typical and spectacular karst landforms, provided environmental conditions are appropriate. The Shibing Karst displays varied karst landforms including flat top hills, cliffs, and canyons resulting in columnar-shaped isolated peaks, tufted-peak-clusters, and knife-ridge mountains. Numerous vertical fractures with almost horizontal stratification in massive dolomite are responsible for these special landforms which are quite distinguishable from limestone landforms.

The Jinfoshan Karst is a unique karst table-mountain characterized by underground river and cave systems with high altitude and multi-level planation surfaces surrounded by massive towering cliffs. Jinfoshan illustrates the process of dissection of the high elevation karst plateau by deep fluvial incision and contains evidence of the region's intermittent uplift and karstification since the Cenozoic. Thus Jinfoshan has

been isolated from the high inland plateau by incision of the surrounding rivers. Beneath the plateau surface are dismembered huge horizontal cave systems that appear at around 2000 m elevation on cliff faces. These once took the runoff of rivers from the high plateau. The plateau must already have been slightly dissected to enable the groundwater circulation that permitted the caves to form, but at that stage the dissection was not deep. Uplift continued and valley incision became more intense, ultimately disconnecting (by river capture) the caves from their headwaters.

The Huanjiang Karst is a direct extension of the existing Libo Karst component of the existing World Heritage property inscribed as part of SCK Phase I. Libo Karst contains a combination of numerous high conical karst peaks, intervening deep enclosed depressions, sinking streams and long underground caves. The World Heritage Committee (Decision 31 COM 8B.11) noted that the cone and tower karsts of the Libo site were considered the world reference site for these types of karst, forming a distinctive and beautiful landscape. The Huanjiang Karst presents comparable karst landforms and landscapes as Libo Karst and its addition to the property area will considerably enhance the integrity of the Libo component.

Although the property was not nominated for its biodiversity values, the nomination dossier includes comprehensive information on aspects of the component vegetation and fauna. Three of the components (Jinfoshan, Shibing and Huanjiang) contain extensive tracts of natural sub-humid forest, habitats for a large number of rare and endangered plants and animals. IUCN notes that the SCK II nomination document does not provide much information on the cave fauna in the four karst components.

3. COMPARISONS WITH OTHER AREAS

IUCN in its 2008 World Heritage Caves and Karst Study noted that the South China region can be considered as one of the two great karst regions of the world, the other being the 'classic karst' region of the eastern Adriatic region of Europe. Therefore, it is clear that the SCK as a whole possesses Outstanding Universal Value. The region can be considered the global type-site for three karst landform styles: fenglin (tower karst), fengcong (cone karst), and shilin (pinnacle karst). Furthermore, there are numerous, large cave systems with rich speleothem development.

The SCK Phase II properties are also nominated under criteria (vii) and (viii). A comparative analysis was carried out by the State Party based on comparison with other geoheritage sites of similar value from the World Heritage List, Tentative Lists, and other sites with similar characteristics and potential as World Heritage sites. There are 53 World Heritage sites with karst features, including 42 natural, 8 cultural and 3 mixed ones. Forty sites among the 53 were listed as fulfilling either, or both, criterion (vii) or (viii); there are another 31 on Tentative Lists. The comparative analysis provides clear reasoning on why the limited selection of sites in Phase II of the South China karst is justified, and analysis has been undertaken in relation to a wide range of sites globally, and within region, including both sites included on the World Heritage List, and other significant karst areas.

In summary SCK Phase II contains a well selected range of component parts, which, together with the existing inscribed property, can be regarded as the most complete and distinctive suite of subtropical karst landscapes with diverse and beautiful examples of fengcong- and fenglin-related landforms and karst tableland. The components contain both magnificent positive relief features of tower and cone karst and also negative relief landforms such as karst valleys and caves that add to the aesthetic importance of the overall series.

Guilin Karst is widely acknowledged as the world's best expression of a tower karst landscape and has been internationally recognized for a long time as the type-site of continental tower karst. The steep sided fengcong and fenglin stand prominently above the horizon. Karst landforms along the Lijiang (Li River) display exceptional aesthetic values and have no analogue in the world. Due to its scenic attractions, Guilin Karst has become one of the most iconic tourist attractions in the world. The expansion of the Lijiang Karst component by some 26% adds valuable additional karst landscape features and greater integrity to the nomination.

Shibing Karst is regarded as the best example of subtropical fengcong dolomite karst in the world. The gorge karst landscape is spectacular with clear water rivers running along picturesque valleys. The landscape illustrates the geological process of rejuvenation which can be seen in many other karst places. However, the rejuvenated fengcong towers here are generally steeper than elsewhere, which may be a consequence of the dolomite lithology. Therefore the dolomite landscape at Shibing is both unusual and impressive, and makes a significant contribution to the SCK.

Jinfoshan Karst is a world-class karst table-mountain surrounded by huge precipitous cliffs punctured by giant entrances to the caves that underlie the mountain. The combination of huge cliffs and caves delivers a spectacular scenic combination. The great tableland with its sublime cliffs and waterfalls, rock pillars, and dense vegetation all contribute to a distinctive aesthetic value accentuated by the vertical zonation of vegetation.

Huanjiang Karst provides a natural extension to the World Heritage listed Libo site which has numerous high conical karst peaks. The Huanjiang Karst has no easily-accessible dramatic commanding viewpoint, and its impressive maze of heavily-forested fengcong peaks is best appreciated from the air. The uniform arrangement and harmonious proportions of the peaks create a wonderful picture.

The three SCK II sites of Shibing, Jinfoshan and Huanjiang have more than 90% of their area clothed in natural vegetation and this provides important habitats of rare and endangered species. The ecosystems provide remarkable examples of harmony between humans and nature in karst areas and thereby greatly increase the aesthetic values. Based on comparative analysis, the karst landforms of the SCK II (combined with SCK I) properties provide the world's most outstanding aesthetic examples of tower karst, cone karst, karst table-mountain and pure dolomite karst in the humid tropics and subtropics of the world.

A further notable point relates to karst landscapes and dolomite lithology. Karst systems do form on dolomite, but not to the same degree as in limestone due to lower solubility. Caves are less well developed and speleothems rather rare. The Nahanni World Heritage Site in Canada is an example of a formerly glaciated dolomite karst with large enclosed depressions or poljes, springs and caves. The Shibing Karst in this nomination is a very good example of humid tropical to subtropical dolomite karst. It is also the best fengcong developed on dolomite in Asia, if not the world.

The Phase I and Phase II serial properties thus provide a representative selection of karsts in South China that collectively demonstrate the evolution of karst in the region and the huge variety of landforms from the high plateau of Yunnan to the tropical lowlands of Guangxi. If inscribed, the overall property would contain the most representative karst landforms including fenglin (tower karst), fengcong (cone karst), shilin (pinnacle karst), as well as other spectacular and diverse karst features such as tiankeng (large dolines or sky windows) natural bridges, gorges and large caves. The SCK property, completed by the sites included in Phase II, thus represents an exceptional history of landscape evolution in one of the world's two great karst regions.

4. INTEGRITY, PROTECTION AND MANAGEMENT

4.1. Protection

All five components of the nomination have legislative protection as they fall within the boundaries of several national parks and/or national nature reserves. The components of the property are protected constitutionally and via several national laws covering environmental protection, wildlife, forestry and water. A series of more detailed regulations operate at Provincial level to establish a comprehensive suite of legal protection.

All components are subject to management plans to ensure protection within an overall management framework. All five have zoning and monitoring programmes. The three-fold zoning system – *strict protection zone, visitor utilization zone, and community utilization zone* – outlined in maps in the overall Management Plan is logical and seems to be sensibly applied in all five components of the site.

All land tenure is vested in the State. Resource use is increasingly regulated; hunting is illegal and firewood collection from the natural landscape is discouraged through the establishment of coniferous plantations on the hill slopes near the villages in the buffer zones. There is no mining in the nominated property. There are traditional rights for sustainable collection of bamboo shoots from part of the Jinfoshan summit plateau, and collection of traditional medicinal plants is allowed under regulation.

IUCN consider that the protection status of the nominated extension meets the requirements of the Operational Guidelines.

4.2 Boundaries

As Phase II of the SCK serial nomination, the integrity requirements of these additional components of the property are twofold: (a) their need to contribute to the overall thematic integrity of the full site and (b) the need for each to have its own landform or geomorphic integrity.

The first integrity challenge, therefore, was to select a small number of new locations complementary in karst characteristics and natural scenery with the components of SCK I yet overall still meeting criteria (vii) and (viii). IUCN consider that this has been achieved with the additional areas nominated. Jinfoshan is a high karst table mountain, an isolated portion of the Yunnan-Chonqing-Guizhou plateau, circumscribed by spectacular cliffs, with multi-level planation surfaces and caves at different levels marking the uplift of the plateau. Shibing is unusual fengcong karst with fengcong-gorge and fengcong-valley landforms developed in dolomitic rocks. Guilin and Putao, the lowest altitude components, complete the development sequence as it is the near-end stage of geomorphological evolution of karst in subtropical climates, with its spectacular iconic landscapes of both cone and tower karst. IUCN welcomes the State Party decision to extend the Lijiang Karst area of the Guilin cluster, following recommendations made following the field mission and as confirmed in supplementary information, thereby adding some of the best fenglin formations in the Guilin Karst area which were not originally included in the nomination, or even in the proposed buffer zone. Some of these represent possibly the best fenglin formations globally. Huanjiang is nominated as an extension (into Guangxi Province) of the Libo cone karst of Guizhou Province in SCK I. While it does not extend the karst landform diversity of the overall serial site, it does enhance its integrity by adding to Libo a contiguous, largely unmodified landscape of cone karst with a cover of monsoonal rainforest.

With respect to the second integrity requirement, both Jinfoshan and Shibing contain all the elements and processes necessary to contribute their distinctive karst characteristics to the overall serial site. As stated above, Huanjiang can be considered as a very natural extension

of Libo, but it is also of high geo- and biophysical integrity in its own right. The Guilin karst component consists of two localities – the Lijiang fengcong section and the Putao fenglin section. The Lijiang section has a high degree of landscape and topographic integrity, being the 34 km-long Lijiang karst gorge and the skyline watershed along this length of the river. It stretches eastward to include the large Guanyan Cave, at 12 km the longest of the 1,000 known caves in Guilin.

All components have well defined boundaries which are considered adequate to ensure protection of scenic and karst values. The buffer boundaries are also considered adequate, often being the defined cadastral boundaries of national parks and other protected areas.

The issue of connectivity is important in hydrological terms, and this is particularly important in the Guilin component. Here three nature reserves have been formed in the Lijiang basin to protect the hydrology. The State Party's extension of the Lijiang Karst component will enhance connectivity. Huanjiang is directly connected to the listed Libo component of SCK Phase I, thereby providing a continuous protected natural landscape of cone karst.

IUCN consider that, with the inclusion of the extension of the Lijiang Karst area, the boundaries of the nominated extension meet the requirements of the Operational Guidelines.

4.3 Management

The State Party has already established a multi-level management system (involving 18 major government agencies, which also co-ordinate a wide range of technical and research institutes, and local communities) across all five SCK Phase II components. In addition, the expertise of several major karst research institutions (such as the Jinfoshan Karst Research Center and the Institute of Karst Geology in Guilin) and universities have contributed to the increasing pool of knowledge for management to undertake protective measures. The State Party has advised of plans to create a unified administration and management system should the SCK Phase II extension be approved. The system to be actioned by 2015 will involve all regional entities where the serial site components occur: Yunnan (Shilin), Guizhou (Libo and Shibing), and Guangxi (Huanjiang and Guilin) provinces, and the municipality of Chongqing (Wulong and Jinfoshan). Under the national guidance of MoHURD, a *South China Karst Coordination Committee of World Heritage Protection and Management* will be set up to co-ordinate the work of the four regional Management Bureaux. The State Party in its advice of February 2014 has detailed comprehensive governance arrangements and a timetabled action plan for implementation.

Management Plans are already in place for the five existing protected areas and, as noted above, a proposed Management Plan covering all five components of the nomination has been submitted at the time of nomination. The proposed overall Management Plan states that currently there are 309 fulltime staff across the SCK II sites, over 50% of whom are in Jinfoshan; there are another 540 part-time staff (mainly 'security' rangers) and half of these are in the Guilin component. Only 61 of these staff are technical professionals and the overall Management Plan considers that "At present, professional and technical personnel in each of the management teams is relatively weak". If the nomination is listed, it is planned to more than double professional staff by recruiting another 74 over the next three years.

The sources and levels of finance to support all five components are outlined in the nomination. There are some concerns regarding significant variations in resourcing levels between the different components. However, overall financing appears satisfactory.

In light of the existing governance and planning regime plus proposals to create an overall framework for the whole of the SCK, IUCN considers the management of the nominated extension meets the requirements of the Operational Guidelines.

4.4 Community

Although minority peoples (Miao and Dong in Shibing, Maoyan in Huanjiang) are prevalent in two of the components, there is no traditional management of the sites. They are managed by provincial and county state agencies, often working in co-operation with local communities.

Local people expressed satisfaction regarding consultation during the nomination process and the majority expressed support and aspirations connected to conservation and tourism related employment opportunities. Government sponsored infrastructure improvements such as new roads, house renovation and decoration were welcomed by local people met by the mission. Villagers did not seem to be requesting a co-management role but certainly hoped for employment opportunities. In the Jinfoshan and Shibing meetings, concern at outside investors taking tourism opportunities away from local communities was expressed; and with a wish for village-based accommodation and guiding opportunities, local people are looking to the administering agencies to safeguard this.

Should the nominated property be inscribed it would not change existing land tenure. There could however be some negative impacts on some traditional cultural rights, such as restrictions on harvesting of traditional plant-based medicines, and religious practices in some caves of Jinfoshan.

4.5 Threats

The physical isolation, lack of arable land in the fengcong karst, and absence of roads in Shibing and

Huanjiang has saved them from any significant detrimental development. Jinfoshan has remained free of permanent human settlement, with limited cable-car and road access and to date only minimal tourist infrastructure. There is a traditional sustainable harvest of bamboo shoots from a small part of Jinfoshan's summit plateau and this does not seem to detract from the karst features.

Guilin is the most developed component and its natural environment has suffered from significant development in the past. A large population live upstream of the Lijiang Gorge and their impact on both the flow volume and water quality of the Lijiang River (especially from water abstraction for both municipal water supply and irrigation, the discharge of sewage waste and the leaching of agricultural pollutants) is well-covered in the proposed overall Management Plan. The Guilin authorities have taken a number of remedial measures since the 1980s, such as relocating large-scale industrial, quarrying and mining activities and treating 90% of the domestic and industrial sewage discharges in the Lijiang River Basin in 20 sewage treatment plants.

There are two main threats to the karst sites: (a) agricultural (and human settlement in Guilin) pollution of allogenic waters and (b) anticipated increasing tourism pressures. The threats from village-based agriculture in the buffer zone of Shibing (especially upstream of the nominated core) has been recognized and is being addressed by improvements in crop selection and site management to minimize runoff, restriction of pesticide use, education on avoiding discarding litter to waterways, village waste treatment, household production of biogas to avoid the cutting of forest for firewood, etc. The field mission inspected examples of this effort, coupled with aesthetic and environmental improvements in village buildings, road design, and dwelling refurbishment being encouraged by government grants. Agricultural threats in Jinfoshan and Huanjiang are not significant but they are a major issue in the Putao section of Guilin. In the Putao segment the challenge is to make the long-standing agricultural and residential activity (mainly small-scale farming of orange orchards and vegetables) as environmentally-benign as possible. This particularly applies to reversing some of the tradition human impacts on the hydrology of the fenglin-plain (especially controlling fertilizer and pesticide use and protecting the waters of the footcaves). A series of remedial programmes are outlined within the proposed overall Management Plan.

With respect to the impact of the human population in Guilin city and the wider basin, management efforts, particularly over the past 5 years, have sought to minimize pollutants entering the hydrology of the Lijiang catchment. All counties on both sides of the Lijiang had waste treatment plants by 2011, removing 93% of pollutants from the water (the other 7% comes from scattered households not yet in the network). Of the total 300 million yuan spent on water treatment each year in Guangxi Province, one third is spent on keeping the Lijiang as clean as possible, and 45% of the price for using each m^3 of water goes into water treatment.

Since the 1980s, more than 100 million tourists have visited the remarkable Guilin karst landscapes and currently 1,500,000 visitors annually come to the Lijiang segment of Guilin. Most of these tourists only undertake sightseeing cruises through the Lijiang Gorge and they have little direct physical impact on the karst landscape itself. The quality of the visitors' sightseeing experience is a major consideration for the guides on the 100 large boats and 450 village-based bamboo rafts, with careful spacing of the larger boats and training to ensure that visitors respect this natural environment. However, this level of visitation is steadily increasing and can be expected to increase further if the Guilin karst component is listed. The whole issue of controlling tourist infrastructure (management of 'show caves', hotels and village-based accommodation, power lines and other utilities, etc), inappropriate riverbank structures, and cruise boat waste disposal along the Lijiang Gorge has been an on-going management challenge in the past and a wide range of remedial measures for Guilin are addressed in the Management Plan.

Increasing tourist pressure is also a threat to Jinfoshan, judging by the large number of tourist hotels being built in the valleys around the periphery of the buffer zone. It was stated that many of these were to accommodate recreational visits to the cooler mountains by the large population of Chongqing city; however, this may lead to increasing pressure for easier access to the summit plateau and its karst features (especially the caves and 'ancient stone forest'). The small capacity of the existing north cable car is currently a limiting factor. The current level of tourist facilities on Jinfoshan's summit plateau is not detracting from the aesthetic values of the landscape but there is a major question about how the outstanding natural values of the site could be sustained if pressure for day visits escalated sharply. The Shibing component does have a small tourist inflatable raft enterprise on a 10 km fengcong-gorge section of the Shanmuhe from Jiangjiatian to Niejiayan. This is currently a sustainable, well-managed experience of the karst landscape from the narrow riverbed. There are no observable detrimental environmental impacts and it is likely that river flow conditions play a major role in regulating the intensity of use, now and in the future.

In summary, IUCN welcomes the positive proposal of the State Party to expand the Lijiang Karst component of the nomination and its commitment to address a number of existing and potential threats. IUCN considers that the integrity, protection and management of the nominated property meet the requirements of the Operational Guidelines.

5. ADDITIONAL COMMENTS

5.1 Justification for Serial Approach

a) What is the justification for the serial approach?
The framework for a serial nomination to conserve the scale of the SCK has already been established through the decisions of the World Heritage Committee in 2007 when the three components of Phase I were listed. In short, there is every justification for a serial approach to cover the diversity of karst landforms and processes in South China.

SCK Phase II along with the components of SCK Phase I together constitute a complete serial site. The total property contains the most representative karst landforms of South China from interior high plateau to lowland plains. In combination it constitutes the outstanding example of humid tropical to subtropical karst. IUCN note that elements of the South China karst region also extend into neighbouring Viet Nam, including some sites of comparable significance to components of the SCK.

b) Are the separate component parts of the nominated property functionally linked in relation to the requirements of the Operational Guidelines?
The SCK Phase II component parts complement those presented in SCK Phase I and together they provide a more complete serial heritage than achieved by either on its own. The serial property will then contain representative karst landforms from plateau to low-lying plain. It also displays a complete karst evolutionary sequence, as well as some of the most spectacular and diverse karst landscapes in the world, such as dissected plateau, table-mountain karst, tiankeng and pure dolomite karst. Together they tell the geological history and karst landscape evolutionary story from the Permian to the present.

c) Is there an effective overall management framework for all the component parts of the nominated property?
There are existing management plans for all five current protected areas. There is also an 'effective overall framework' coordinating the management of the five components which are the subject of this nomination for extension. As noted above, there are proposals to establish enhanced coordination measures across the entire SCK should this extension be approved.

6. APPLICATION OF CRITERIA

The **South China Karst (Phase II)** has been nominated under natural criteria (vii) and (viii) as an extension of the South China Karst.

Criterion (vii): Superlative natural phenomenon or natural beauty and aesthetic importance
SCK Phase II contains an exceptional and distinctive subtropical karst landscapes with beautiful and diverse examples of fengcong-depression, fengcong-gorge, fengcong-valley, tableland, and fenglin-plain, complementing SCK Phase I. The components contain both magnificent positive relief of cone and tower karsts and also negative landforms such as karst valleys and caves that add to the aesthetic importance. Each nominated component has its own distinctive natural landscape characteristics. The additional karst landforms of Phase II of the SCK will complete the diverse spectrum of SCK landscapes and landforms. In addition, the three SCK Phase II sites of Shibing, Jinfoshan and Huanjiang have more than 90% of their areas covered with natural vegetation and are the habitats of rare and endangered species. These natural ecosystems greatly increase the aesthetic values of the nomination. The Lijiang Gorge section of Guilin is renown globally as one of the most dramatic and scenic riverine landscapes in the world. All five components contain superlative natural phenomena in some of their karst features. The karst landforms of the SCK Phase II (combined with SCK Phase I) properties represent the most aesthetically outstanding examples of tower karst, cone karst, karst table-mountain and pure dolomite karst in the humid tropics and subtropics in the world.

IUCN considers that the nominated property meets this criterion.

Criterion (viii): Earth's history and geological features
The nominated SCK II properties display a great variety of surface and underground karst landforms. Tower karst in Guilin, dolomite karst in Shibing and table-mountain karst in Jinfoshan are the most typical landforms with significant geomorphic value. With the Huanjiang Karst, they represent an outstanding global example of cone karst. All of these represent karst evolution under continental interior humid tropical to subtropical conditions. Guilin Karst is the world type-site for continental humid tropical tower karst. It contains the best international example of continental fenglin (tower karst), providing a perfect geomorphic expression of the end stage of karst evolution in South China. Shibing Karst illustrates the best dolomite fengcong-gorge karst in South China. Similar landscapes are common in humid tropical limestone karst regions, but are extremely rare in pure dolomite terrain. For this reason, Shibing Karst can be noted as the global reference site for humid tropical to subtropical dolomite karst. Jinfoshan Karst is a world-class example of karst table mountain. Huanjiang Karst is a direct extension of the Libo Karst which provides a world-class example of fengcong (cone karst) and is the prime example of cone karst evolution in the humid tropical and subtropical continental interior. The progressive evolution of South China's karst is a globally-significant outstanding geological story. SCK Phase II further enhances the evolutionary story advanced in part in Phase I of SCK.

IUCN considers that the nominated property meets this criterion.

7. RECOMMENDATIONS

IUCN recommends that the World Heritage Committee adopt the following draft decision:

The World Heritage Committee,

1. Having examined Documents WHC-14/38.COM/8B and WHC-14/38.COM/INF.8B2;

2. Approves the **South China Karst Phase II (China)** as an extension of the South China Karst on the World Heritage List under natural criteria (vii) and (viii).

3. Adopts the following Statement of Outstanding Universal Value for the property as a whole (Phase I and Phase II component parts), replacing the Statement of Outstanding Universal approved by Decision 31COM 8B.11 in 2007:

Brief synthesis

The huge karst area of South China is about 550,000 km^2 in extent. The karst terrain displays a geomorphic transition as the terrain gradually descends about 2000 meters over 700 kilometers from the western Yunnan-Guizhou Plateau (averaging 2100 meters elevation) to the eastern Guangxi Basin (averaging 110 meters elevation). The region is recognized as the world's type area for karst landform development in the humid tropics and subtropics.

The World Heritage Property of South China Karst is a serial property that includes seven karst clusters in four Provinces: Shilin Karst, Libo Karst, Wulong Karst, Guilin Karst, Shibing Karst, Jinfoshan Karst, and Huanjiang Karst. The total area is 97,125 hectares, with a buffer zone of 176,228 hectares. The property was inscribed in two phases.

***Phase I** inscribed in 2007, include three clusters totaling 47,588 hectares, with buffer zones totaling 98,428 hectares:*

- *The **Shilin Karst** component is in Yunnan province and contains stone forests with sculpted pinnacle columns and is considered the world reference site for pinnacle karst. Shilin Karst consists of two core areas surrounded by a common buffer zone. The area is 12,070 hectares with a buffer zone of 22,930 hectares. The buffer zone is designated as a UNESCO Geopark.*
- *The **Libo Karst** component is in Guizhou province and includes high conical karst peaks, intervening deep enclosed depressions (cockpits), sinking streams and long underground caves. The area is considered a world reference site for cone karst. The property consists of two core areas surrounded by a common buffer. The area is 29,518 hectares with a buffer zone of 43,498 hectares. One of the components is a national nature reserve.*
- *The **Wulong Karst** component is in Chongqing province and consists of high inland karst plateaux that have experienced considerable uplift. Its giant dolines and bridges are representative of South China's tiankeng (giant collapse depression) landscapes, and provide the evidence for the history of one of the world's great river systems, the Yangtze and its tributaries. The Wulong Karst component is a cluster of three core zones, each with a separate buffer zone. The areas total 6,000 hectares with buffer zones of 32,000 hectares.*

***Phase II** inscribed in 2014 includes four clusters totaling 49,537 hectares, and buffer zones totaling 77,800 hectares:*

- *The **Guilin Karst** component in Guangxi province is located within Lijiang National Park and contains fenglin (tower) and fengcong (cone) karst formations. Guilin Karst is divided into two sections: the Putao Section with an area of 2,840 hectares and a buffer zone of 21,610 hectares and the Lijiang Section with an area of 22,544 hectares and a buffer zone of 23,070 hectares.*
- *The **Shibing Karst** component in Guizhou province includes dolomitic karst formations and is located within Wuyanghe National Park. Shibing Karst has an area of 10,280 hectares and a buffer zone of 18,015 hectares.*
- *The **Jinfoshan Karst** component is a unique karst table mountain surrounded by towering cliffs. Jinfoshan Karst is located in Chongqing province within the boundaries of the Jinfoshan National Nature Reserve and Jinfoshan National Park. The Jinfoshan component has an area of 6,744 hectares and a buffer zone of 10,675 hectares.*
- *The **Huanjiang Karst** component is a cone karst area located in Guangxi Province within the boundaries of the Mulun National Nature Reserve. The Huanjiang Component has an area of 7,129 hectares and a buffer zone of 4,430 hectares.*

The South China Karst World Heritage property protects a diversity of spectacular and iconic continental karst landscapes, including tower karst (fenglin), pinnacle karst (shilin) and cone karst (fengcong), as well as other karst phenomena such as Tiankeng karst (giant dolines), table mountains and gorges. The property also includes many large cave systems with rich speleothem deposits. The karst features and geomorphological diversity of the South China Karst are widely recognized as among the best in the world. The region can be considered the global type-site for three karst landform styles: fenglin (tower karst), fengcong (cone karst), and shilin (stone forest or pinnacle karst).The landscape also retains most of its natural vegetation, which results in seasonal variations and adds to the outstanding aesthetic value of the area.

The property contains the most spectacular, scientifically significant and representative series of karst landforms and landscapes of South China from interior high plateau to lowland plains and constitutes the world's premier example of humid tropical to subtropical karst: one of our planet's great landscapes. It complements sites that are also present in neighbouring countries, including Viet Nam, where several World Heritage properties also exhibit karst formations.

Criteria

Criterion (vii)

The South China Karst World Heritage property includes spectacular karst features and landscapes, which are both exceptional phenomena, and of outstanding aesthetic quality. It includes the stone forests of Shilin, superlative natural phenomena which include the Naigu stone forest occurring on dolomitic limestone and the Suyishan stone forest arising from a lake, the remarkable fengcong and fenglin karsts of Libo, and the Wulong Karst, which includes giant collapse depressions, called Tiankeng, and exceptionally high natural bridges between them, with long stretches of deep unroofed caves.

It also includes Guilin, which displays spectacular tower karst and internationally acclaimed fenglin riverine landscapes, Shibing Karst, which has the best known example of subtropical fengcong karst in dolomite, deep gorges and spine-like hills often draped with cloud and mist, and Jinfoshan Karst, which is an isolated island long detached from the Yunnan-Guizhou plateau, surrounded by precipitous cliffs and punctured by ancient caves. Huanjiang Karst provides a natural extension to Libo Karst, contains outstanding fengcong features and is covered in almost pristine monsoon forest.

The property's forest cover and natural vegetation is mainly intact, providing seasonal variation to the landscape and further enhancing the property's very high aesthetic value. Intact forest cover also provides important habitat for rare and endangered species, and several components have very high biodiversity conservation value.

Criterion (viii)

The South China Karst World Heritage property reveals the complex evolutionary history of one of the world's most outstanding landscapes. Shilin and Libo are global reference areas for the karst features and landscapes that they exhibit. The stone forests of Shilin developed over 270 million years during four major geological time periods from the Permian to present, illustrating the episodic nature of the evolution of these karst features. Libo contains carbonate outcrops of different ages shaped over millions of years by erosive processes into impressive Fengcong and Fenglin karsts. Libo also contains a combination of numerous tall karst peaks, deep dolines, sinking streams and long river caves. Wulong represents high inland karst plateaus that have experienced considerable uplift, with giant dolines and bridges. Wulong's landscapes contain evidence for the history of one of the world's great river systems, the Yangtze and its tributaries. Huanjiang Karst is an extension of the Libo Karst component. Together the two sites provide an outstanding example of fengcong karst and also preserves and displays a rich diversity of surface and underground karst features.

Guilin Karst is considered the best known example of continental fenglin and provides a perfect geomorphic expression of the end stage of karst evolution in South China. Guilin is a basin at a relatively low altitude and receives abundant allogenic (rainfed) water from surrounding hills, leading to a fluvial component that aids fenglin development, resulting in fenglin and fengcong karst side-by-side over a large area. Scientific study of karst development in the region has resulted in the generation of the 'Guilin model' of fengcong and fenglin karst evolution. Shibing Karst provides a spectacular fengcong landscape, which is also exceptional because it developed in relatively insoluble dolomite rocks. Shibing also contains a range of minor karst features including karren, tufa deposits and caves. Jinfoshan Karst is a unique karst table mountain surrounded by massive towering cliffs. It represents a piece of dissected plateau karst isolated from the Yunnan-Guizhou-Chonqing plateau by deep fluvial incision. An ancient planation surface remains on the summit, with an ancient weathering crust. Beneath the plateau surface are dismembered horizontal cave systems that appear at high altitude on cliff faces. Jinfoshan records the process of dissection of the high elevation karst plateau and contains evidence of the region's intermittent uplift and karstification since the Cenozoic. It is a superlative type-site of a karst table mountain.

Integrity

The components of the serial property have within their boundaries all the necessary elements to demonstrate the natural beauty of karst landscapes. They also contain the scientific evidence required to reconstruct the geomorphic evolution of the diverse landforms and landscapes involved. The components are of adequate size and they have buffer zones which will help ensure the integrity of the earth science values, including tectonic, geomorphic and hydrological features. Some issues that face the property require policies and actions to be taken beyond the buffer zone boundaries. Challenges to the integrity of the property include human pressure both from people living in and/or around the property, and the pressures from visitors. However many measures have been and are being undertaken to address these issues. The natural environment and natural landscapes within the nominated properties are all well-maintained, in order to protect the features of Outstanding Universal Value, and the natural landscapes and processes that support them.

Protection and Management Requirements

The property is well managed, with management plans in place for each component, and which will be established and maintained for the serial property a whole, and with effective involvement of stakeholders. Part of Libo Karst is within a national nature reserve. The buffer zone for Shilin is a UNESCO-recognised Global Geopark. Traditional management by minority peoples is an important element in management of a number of components, and the relationship between karst and the cultural identity and traditions of minority groups, including for example the Yi (Shilin), the Shui, Yao and Buyi (Libo) and Jinfoshan bamboo harvesters requires continued recognition and respect in site management.

There are strong international networks in place to support continued research and management. Continued efforts are required to protect upstream catchments and their downstream and underground continuation to maintain water quality at a level that ensures the long term conservation of the property and its subterranean processes and ecosystems. Potential for further extension of the property requires development of a management framework for effective coordination between the different clusters.

Guilin, Shibing and Jinfoshan are national parks; Jinfoshan is a national nature reserve and Huanjiang is a national nature reserve and a Man and Biosphere Reserve. These components therefore benefit from a history of protection under relevant national and provincial laws and regulations and each of the Phase II component parts has a management plan. An integrated Management Plan of the South China Karst to support the sites added in 2014 has been developed.

Long term protection and management requirements for the component parts of the South China Karst include the need to ensure coordination throughout the serial site as a whole, through the establishment of a Protection and Management Coordination Committee for the South China Karst World Heritage; further enhance involvement of local communities and the maintenance of the traditional practices of the indigenous peoples concerned; strengthen whole catchment management to assure water quality is protected, and to avoid pollution; and strictly prevent negative impacts from tourism, agriculture and urban development activities from impacting the values of the property.

4. Urges the State Party to continue efforts to integrate planning, governance and management across the whole South China Karst World Heritage site including the proposed finalization of a management plan anticipated by 2015.

5. Commends the State Party for its efforts to manage diverse threats to the property arising from tourism, water pollution, agriculture and urban development activities and recommends the continued close monitoring of these potential impacts.

6. Further notes that the inscription of this property completes the South China Karst serial property, thereby making a significant contribution to the recognition of karst sites on the World Heritage List and setting a high standard for the quality of argument required to support inscription of any further karst sites; and therefore signals that the numbers of additional karst sites suitable for inscription on the World Heritage List is likely to be very small.

7. Recommends that the State Party consider future re-nomination of South China Karst properties under biodiversity criteria in light of the intact forest cover in many of the properties which are of high biological value.

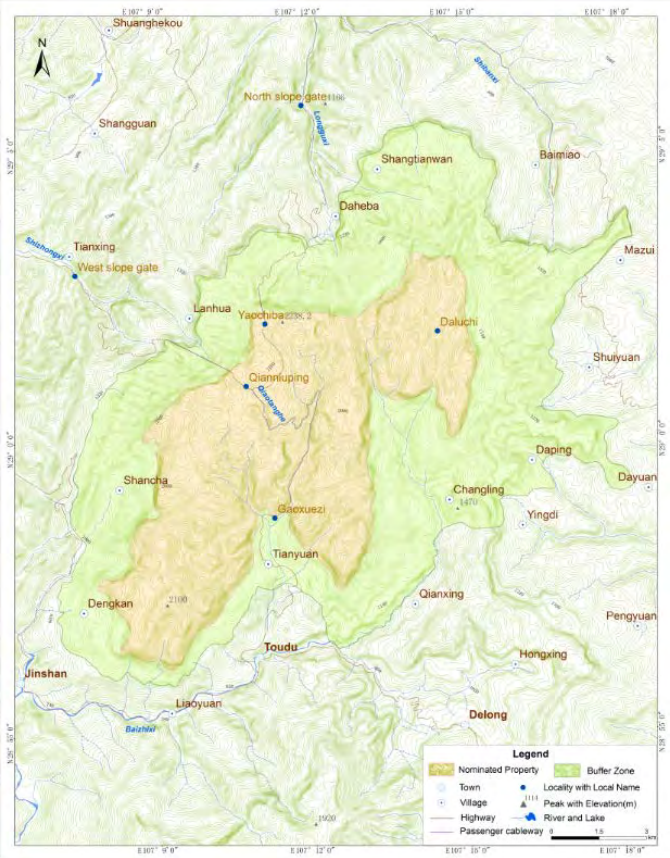
8. Encourages the State Party to cooperate with the State Party of Viet Nam to ensure technical cooperation and exchange as well as the harmonization of management practice and promotion in line with the transnational dimension of the karst systems of the South China region, recognising sites in neighbouring States Parties that are recognised or have potential Outstanding Universal Value.

9. Further requests the State Party to submit, by **1 February 2017**, a report, including a 1-page executive summary, on the state of conservation of the property, including progress on the finalization of a property-wide management plan; the implementation of integrated governance arrangements; and the implementation of actions to manage tourism, water quality, agricultural and urban development impacts to ensure protection of the property, for examination by the World Heritage Committee at its 41st session in 2017.

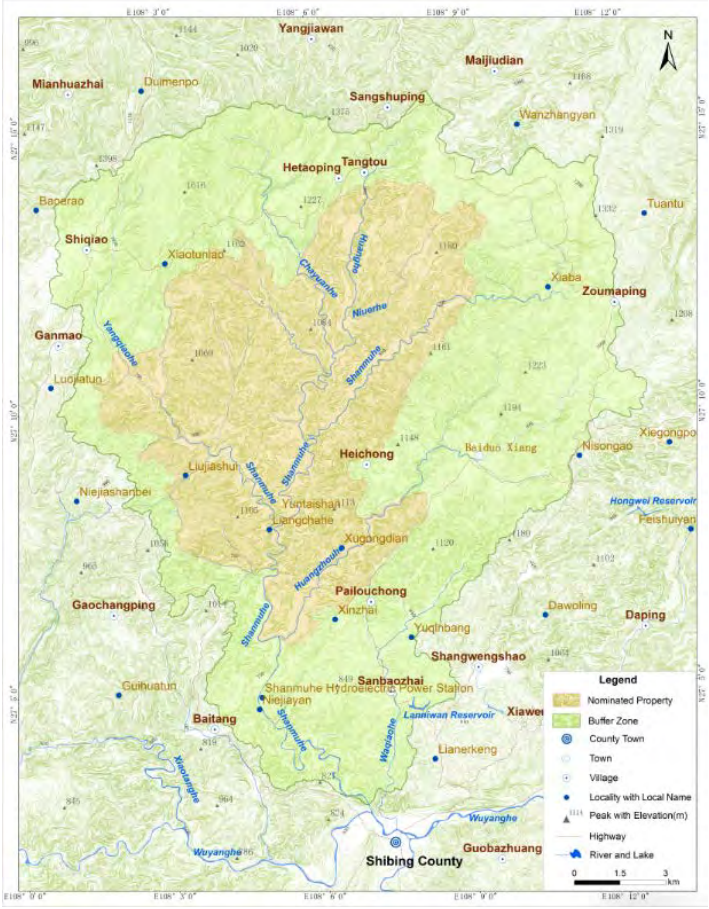
Map 1: Nominated property location

Map 2: Huanjiang Karst Component and buffer zone

Map 3: Jinfoshan Karst Component and buffer zone



Map 4: Shibing Karst Component and buffer zone



Map 5: Guilin Karst Component and buffer zone