PRELIMINARY PROPOSAL FOR THE PROJECT »HEAVEN'S CAVE« (VIETNAM) ADAPTMENT FOR TOURIST PURPOSES

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Abstract: Heaven's cave is located in the centre of the Phong Nha-Ke Bang national park, about 500 km southern from the Vietnamese capital and 40 km from the city of Dong Hoi. Phong Nha-Ke Bang national park is protected also as a UNESCO world heritage site. Due to economic situation in this region as a result of lack of natural resources, karst tourism represents an important opportunity for raising the quality of living in the province. A proposal to adapt non touristic Heaven's cave for tourism was presented to Karst Research Institute at ZRC SAZU in 2006.

Keywords: Heaven's cave, Thien Duong cave, Phong Nha-Ke Bang, Vietnam, show cave

INTRODUCTION

Quang Binh Province, situated about 500 km southern from the capital Hanoi, is one of the poorest provinces of Vietnam (per capita GDP is half the Vietnamese average). With the aim of improving the economic situation in the area, the possibility has been raised of marketing sights in the Phong Nha-Ke Bang National Park, a UNESCO World Heritage Site as tourist attractions. Among these sights, as yet unexploited for tourism purposes, is Heaven's Cave (in Vietnamese Thien Duong).

The Phong Nha-Ke Bang National Park (Fig. 1) covers an area of 857.54 km^2 and is a UNESCO World Heritage Site, reflecting its global importance (World Heritage..., 2000). The park came under UNESCO protection in 2003 because of its extraordinary stratigraphical diversity (from the Precambrian to the present day – over 400 million years), the long development of its topography (from the Oligocene to the present day – over 36 million years) and the resulting extremely intensively developed karst formations. Over 300 karst caves have been recorded in the park, among which the most extensive is Hang Vom cave system with 15,310 m long cave

Fig. 1. Tropical karst in the middle of the Phong Nha-Ke Bang National Park. Photo: M. Knez

passages (Limbert, 2010). The park's geological and geomorphological diversity is closely followed by its considerable biodiversity in terms of both fauna and flora, and its extraordinarily well conserved tropical karst forests.

The central limestone area is bordered by impermeable strata which collect water on the surface and in the southern part of the park discharge it towards the Chay River lying further north. This inflow of allogenous water, combined with the long development, is the main factor of the development of the underground caves explored to date. Excellent examples of caves of this type are the Phong Nha (show cave) and Hang Vom cave systems. With the entrenchment of the Chay River, the underground flows shift lower and lower and leave fossil caves at the higher levels. Examples of such caves are Tien Son Cave, rich in calcite deposits and open to tourists as a show cave, and Heaven's cave. The caves follow the bedding planes into the thickly stratified Devonian-Carboniferous-Permian limestone and numerous faults tied to the predominantly N–S faults in the Alpine orogen (World Heritage..., 2000). Long-term karstification is also facilitated by limestone strata over 1,000 metres thick.

The first task was to measure the cave in order to establish its ground plan, longitudinal profile and significant cross-sections. At the same time a speleological evaluation of the cave is being carried out, in other words a description of the current state as regards geology, geomorphology, hydrology, meteorology, speleobiology and archaeology and palaeontology. The description of the current state includes a photographic inventory of significant elements of the cave. On the basis of these characteristics of the cave, the risks to and vulnerability of the cave is defined, and fundamental nature protection guidelines highlighted. The second part of the research presents a range of identified tourist attractions with a proposal of access to them (type and route of path for tourists) and a proposal of illumination. Use of the cave as a show cave must correspond to sustainable nature protection guidelines, since only in this way can we maintain the cave in its natural equilibrium. Access to the cave is very important. This is based on the proposed use of the cave as a show cave (number and type of visitors), the carrying capacity of the external environment and UNESCO guidelines.

GENERAL CAVE DESCRIPTION

Entrance to Heaven's cave is located at about 226 m a.s.l. under the vertical cliff. Entrance part is quite narrow since it leads through collapse blocks, which accumulated over the long geomorphic development at the foot of a cliff. The easiest access leads through 3 × 4 m void between collapse blocks. The continuation is developed as 65 m long slope with inclination 45°. The upper part is formed by solid rock whereas the lower part is developed as a steep scree. In the middle of a scree, two over 5 m high and 3 m wide stalagmites are located. Foot of a scree is covered by silty and loamy sediment and by bat guano. This part of the cave is actually a huge underground chamber 120 m long, 60 m wide and up to 30 m high (Fig. 2). At the southern side, dry water channel is located.

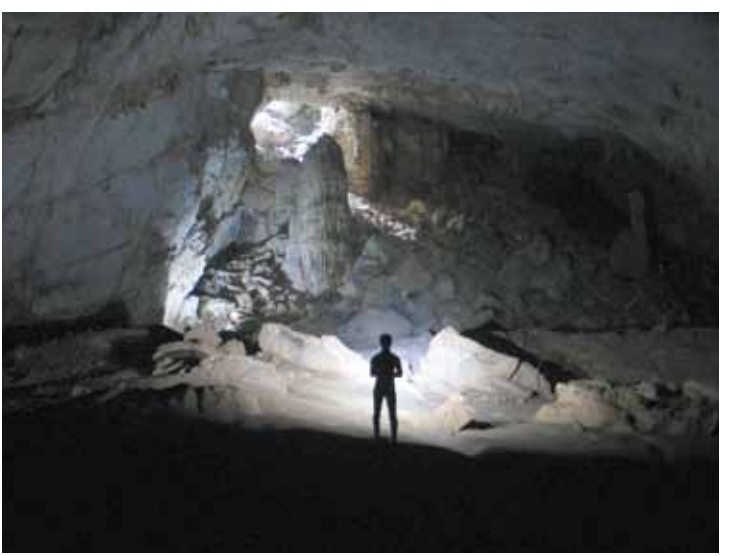

Fig. 2. Huge entrance chamber in Heaven's cave. Photo: M. Prelovšek

Downstream continuation is blocked with collapse material and loamy sediments, whereas the upper continuation of the cave leads toward the west. Bottom of the cave is covered with several meters wide rimstone dams, which are partially covered with mud but active since the calcite crystals are not corroded by mud deposits. The deepest exceed 1 m and is usually partly filled with water. The other seems to be mostly dry but the water can fill them after strong precipitation. Another area of rimstone dams is located south-western of the first ones. There, cave passage is developed as about 30 m wide and more than 20 m high nearly horizontal passage. All along this passage, dry water channel is incised into the sediment terrace at both sides of a passage. Where the channel meanders, left or right terrace are often absent. Since the terrace is the driest part of the cave bottom, several stalagmites and columns appear there. Rather than individually, they are formed as a group under the well-cracked and karstified carbonate rock. The most impressive was named after palm tree – Cot Nhu Da. Continuation of a passage is similar to the already described parts of the cave.

EVALUATION OF HEAVEN'S CAVE'S POTENTIAL FOR TOURISM

The cave is practically invulnerable in the meteorological sense, since at least in winter and summer it is extremely well ventilated. The absence of archaeological finds and palaeontological remains keeps it invulnerable in this sense too. The cave is most vulnerable in the sense of the morphology of deposited sediments (speleothems and loam). The most sensitive features are rimstone dams (Fig. 3). Walking alternately over loam and calcite surfaces results in the loam being transferred to the speleothem-covered surfaces. It is not possible to define speleobiological risks and guidelines on the basis of present research and knowledge. Further research indicating the numbers of animal species, their rarity and their protection, would be necessary. Due to high biodiversity of Phong Nha-Ke Bang national park and long geomorphic evolution, high biodiversity can be expected also in the cave. Periodical floods in Heaven's cave are serious threat to touristic infrastructure, if the cave will be developed as a show cave. Since the time of their appearance, frequency, durability and their height are of the highest value to estimate their potential threat to touristic development, monitoring of water level will be necessary in the future. At the end of our fied observations, data logger was installed to measure oscilation of water level and temperature in the main passage.

Large stalagmites and pillars, and rimstone dams are the greatest tourist attraction of the cave, since they are of above-average dimensions and are perfectly conserved (Fig. 3). Owing to their fragility they are also most at risk in the case of unsuitable walking through the cave. From the European and North American perspective, the location of cave formations so close to the entrance is surprising, but scientifically expected in a tropical climate due to the absence of frost weathering.

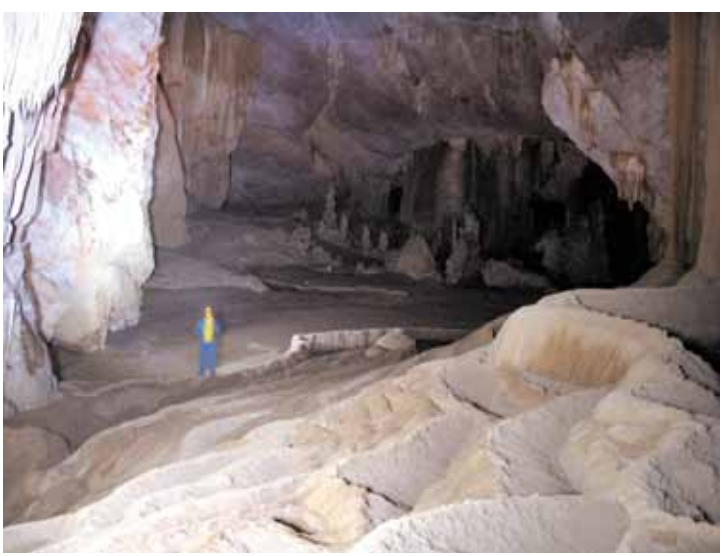

Fig. 3. Rimstone dams. Photo: M. Prelovšek

Another unique attraction is Heaven's cave's position as part of the long cave system of Hang

Vom, one of the longest and largest water caves in the world. Hang Vom itself is very dangerous for visitors because of the frequent and sudden floods, but the rise in the water level in Heaven's cave is presumably considerably slower, more predictable, the exit from the cave is higher than the highest possible flood and quite near the furthermost point of the measured section of the cave.

Heaven's cave has very good educational potential since it offers a good and varied insight into speleological and karst phenomena, while the route to the cave and the beautiful environment of the Chay River offer a good insight into the biological characteristics of a humid tropical forest on karst rock.

Tourism in Phong Nha-Ke Bang National Park is mainly concentrated in the area of the Phong Nha and Tien Son caves. Owing to their great attractiveness, these represent a considerable potential for tourism, which in our opinion, however, is far from being sufficiently exploited.

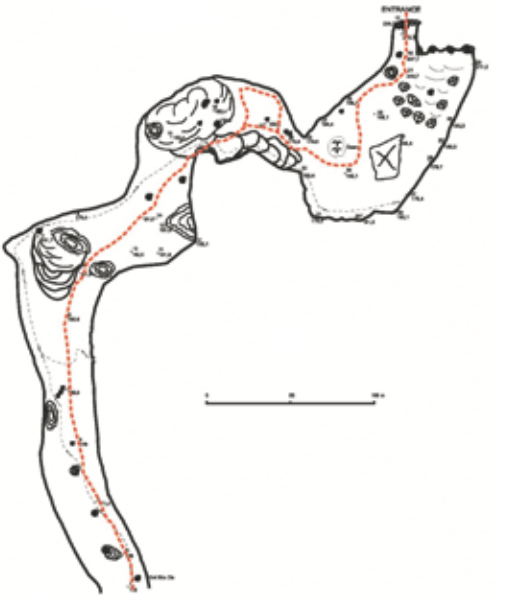

Fig. 4. Proposal for Trekking or Adventure visit.

POSSIBILITIES OF SHOW CAVE EQUIPMENT FOR THE CAVE AND ACCESS

Adapting the Heaven's cave for tourism purposes is a technically demanding project because of its specific geographical position (remoteness), somewhat unstable sediments and alluvial deposits, high ceiling and unknown fluctuation of water level. The cave is a sensitive ecosystem and all touristic influences should be evaluated. Due to cave's location in the national and UNESCO park, necessary permission from the relevant ministries of the Vietnamese government, and from UNESCO should be acquired.

An outline plan for classic cave visit has been drawn up for the laying-out of a 550-metre footpath for mass tourism. It has been proposed that the walking surfaces in the cave should be made of non-corrosive materials and be light and removable. The whole path should be built on pillars in order to avoid major building work and damage to the floor of the cave (Fig. 5). Man-made tunnel below natural entrance would make the entrance easier for visitors. A proposal has been prepared of a 60-metre man-made tunnel that would enable visitors to avoid the steps that would otherwise be urgently necessary in the entrance section of the cave. This would probably increase the number of visitors, but here the opinion of UNESCO should be followed.

To access the cave's entrance we proposed three variants of access. Access by footpath would follow the existing path through the rainforest, along the river and end with a steep ascent towards the cave entrance. In view of the great biodiversity and historical importance of the area, it could also serve as a nature/history trail if suitable explanations were provided. Access by road envisages the construction of a road 3 km long and 4–5 m wide from the car park to an esplanade outside the cave entrance. The road would be exclusively intended for the transporting of visitors to the cave by minibus or roadmobile. Visitors would leave their vehicles in the car park by the main road, where other tourist infrastructure would be built (information centre, restaurant, souvenir shops, toilets, etc.). Access to the cave could also be implemented by constructing a gondola-type cable car to carry visitors to the top of the overhanging cliff above the cave. From here visitors would be transported to the cave by vehicles. The idea was presented at the

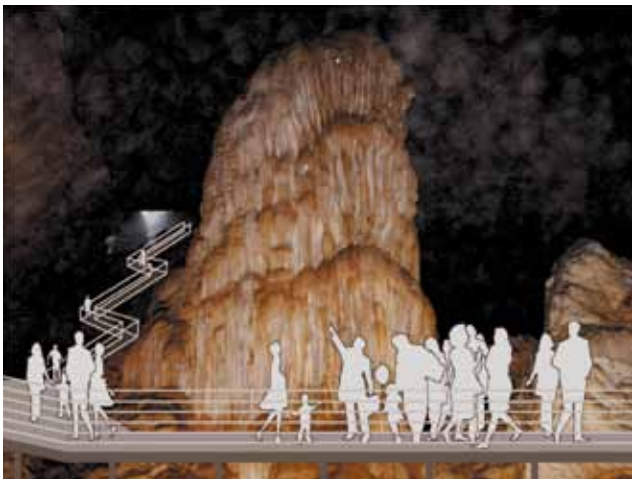

Fig. 5. Visualization of touristic infrastructure in the entrance chamber.

request of the Vietnamese partners, although the prevailing opinion is that UNESCO would not permit construction of this kind in the natural environment of the park.

DEVELOPMENT OF AN INTEGRATED MARKETING MIX

The aim of the project to develop a base for establishing tourism in the Phong Nha-Ke Bang National Park is to set up a comprehensive marketing network which will help create an adequate range of primary tourist services to meet foreign tourists' needs, as well as a secondary range of tourist services, define relationships with tour operators and establish a comprehensive system for promoting the national park.

In view of the fact that tourism is still at a very basic level in Quang Binh province, where Phong Nha-Ke Bang National Park is situated, basic information about potential visitors, their structure, needs, preferences, etc. still had to be obtained.

Proposals for further development of primary tourist services were formulated on the basis of the collected data (the key attractions that bring in visitors and are the reason for their visit to the national park), and also involved the development of secondary tourist activities (the range of services, level of quality, standards etc.).

CONCLUSION

Heaven's cave, as part of one of the longest water cave systems in the world (Hang Vom), is a speleologically important part of Phong Nha-Ke Bang National Park. Although flood waters occasionally appear in the cave, these are believed to be considerably less intensive and of shorter duration than those in Hang Vom. From this point of view Heaven's cave is very suitable for the development of a more educational form of tourism in the sense of karstology and speleology in the wider area, while it also has a number of remarkable cave formations (rimstone dams, massive stalagmites and dripstone pillars). The biggest weakness of the cave is access, which in the case of major investment in the cave would require significant development in the park. From this point of view it would be essential to obtain the consent of UNESCO. The assessment of tourist potential will carry more weight once the completed questionnaires have been obtained. On their basis an integrated marketing mix will be developed for the park and for Heaven's cave.

Despite the fact that this criterion was considered slightly too weak for the park to be included on UNESCO's natural heritage list, we may still consider it to be exceptional. On the contrary, it appears that the potential for tourism is not being sufficiently exploited. It would make sense to include it in the route to Heaven's cave. The view that opens up of the varied relief around the cave could be incorporated into education about the characteristics and development of tropical cone karst.

References

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