

An overview of caving regions in Northern Laos

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Abstract

Four expeditions were undertaken from 2000-2005 to achieve an overview of the caving regions in Northern Laos. The first project was conducted by a Dutch team in 2000 and followed by German (2002, 2003) and joint German-Dutch (2005) expeditions. Five main regions of the North were visited yielding caves with a total length of 25 km: the Nam Ou valley near Muang Ngoy; the Luang Prabang district; the area of Phoukhoun near Kasi; the Vieng Phouka district and near Muang Nan. The largest potential was discovered in Vieng Phouka (Luang Nam Tha province) with the river cave system of Tham Nam Eng. It consists of a 3.1 km long upper fossil system and a 3.5 km long lower active river system. Further planned expeditions will focus on this area which has also the highest potential for show caves.

1. Introduction

This chapter gives an overview of speleological expeditions to Laos and introduces the caving areas in the north. A geological abstract follows. Chapter 2 introduces the cave regions in more detail and the most important discoveries. A look on the Laotian and his relationship to caves is done in chapter 3. The last chapter summarizes and gives an outlook.

1.1 Overview

Since 1992 Laos has rapidly opened to foreign tourists and many successful speleological projects have been carried out, mainly by French teams. On an occasional basis Italian and British caving expeditions have contributed to the knowledge on karst and caves of Laos (Brouquisse et al. 1999). Most of the caving expeditions were dedicated to Khammouane province (Mouret (2001) in central Laos and the area around Vang Vieng (Vientiane province) (Hédouin & Renouard 2000).

Although caves were known from the north of Laos (e.g. the historical Pak Ou show cave near to Luang Prabang) no systematic cave exploration had been done there before a Dutch team started work in the Luang Prabang province in 2000. They surveyed 7.3 km of passages in 16 caves in the Nam Ou Valley and around Muang Nan and released a report on their findings (Eskes & Damen 2004).

The Dutch trip was followed by a lightweight German reconnaissance project to the Nam Ou area around Muang Ngoy in 2002/03 and a larger German project in 2003/04 to Luang Prabang district. This yielded 34 caves with a total of 5.6 km, amongst which was, so far, the longest known cave of northern Laos (Tham Loum at 1.6 km).

Finally, a common German-Dutch expedition to northern Laos was conducted in February 2005. The first part of the project focused on caves at Phou Khoun close to Kasi. The expedition succeeded to connect three separate known caves to one 2.6 km long system (Tham Nam Lot-Seua). However, the main part of the expedition was dedicated to an until then untouched area at Vieng Phouka (Luang Nam Tha province) close to the Burma and Thai border. Here a European Community based micro-project that promotes eco-tourism as an additional local income actively supported the exploration of the caves with local transport and guides. The area surprised with the longest active river caves in the north. It took only a week to survey caves with a total length of 8.9 km. The longest the Tham Nam Eng system consists of an upper 3.1 km long fossil cave and a 3.3 km long lower active river cave. A link could not be found yet.

1.2 Geology

The natural history, as well as the morpho- and orogenesis of northern Laos is complex and poorly known. The following observations were taken from Mouret (2004). Most limestone occurrences in the region are of Upper Paleozoic age (Permian to Carboniferous, 360 – 250 my old). Towards the south some Jurassic limestone successions have been identified in the area around Luang Phrabang. Deposition of limestone obviously has not been continuous in all cases as sometimes 20–50 m thick limestone sequences can be observed that are sandwiched between clay or sandstone layers. The thickness of the limestone succession varies and is suspected to reach at maximum 5,000 meters. The carbonates are in most cases underlain by schists.

Tectonic movements from the Triassic onwards have strongly affected the limestone sequences. The main tectonic

fractures run from N-S and from NE to SW. The carbonates are heavily deformed, often shows a steep or even near-to-vertical dip, are partly recrystallised and metamorph in a way that the porosity of the limestone went lost and even the distinction of the formerly separated layers disappeared. Weathering, known as "case hardening" further contributed to the diagenetic modification of the carbonates leading to a less favorable solubility and lower subsrosion rates.

Karstification of the limestone took place in a moderate tropical climate and the karst landscape is covered by a dense forest. The morphology of the limestone regions can be subdivided into different types:

- a.) Extensive karst massifs with spectacular peaks that summits at about 1,600m-1,900 m in the northern part of the Nam Ou river while the Nam Ou river flows at about 360 m only. The slopes of the massifs are steep and vertical cliffs are abundant. These large massifs cover up to 15 sq. km and are intersected by rivers and dry valleys. The karstifiable limestone has its base at or beyond the current level of the main river.
- b.) Isolated karst mountains that also can form high peaks. These small limestone cones rest on top of non-karstifiable rocks with a diameter of about 250 by 500 meters and a height of 120 m. These isolated mountains are dominant in the region along the Mekong between Luang Phrabang and Pak Ou.

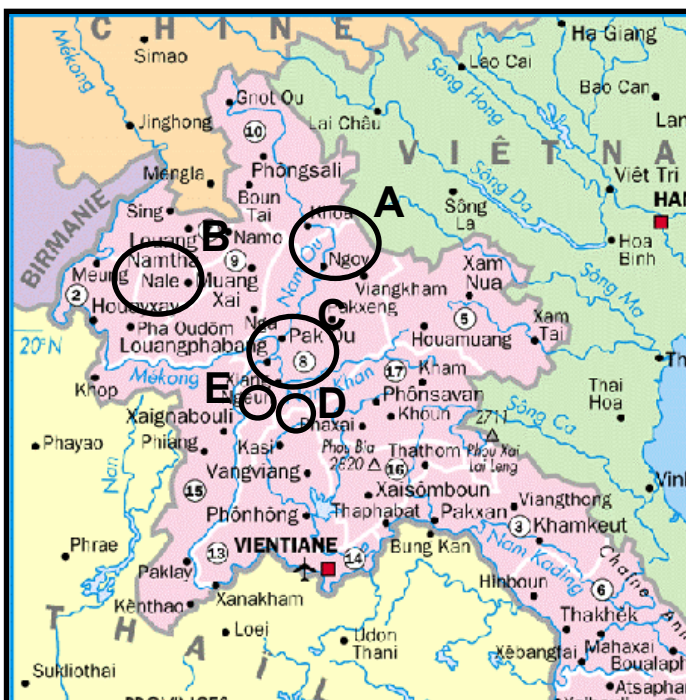
It is suggested that the larger karst massifs and isolated karst cones belonged to much more extensive limestone regions in the past, which are today eroded to a great part. The limestone massifs and cones are fairly easy to locate on the topographical maps due to their steep walls.

Caves are developed on different levels above the current water drainage and give evidence of a multiphase speleogenesis. The Mekong is the main stream in the whole region with the Nam Ou being its largest tributary river. Both rivers are still important transport and traveling routes. The Nam Ou traverses several large karst massifs in a deeply incised scenic gorge, which appears to be mainly the result of erosive down-cut of the river.

The limestone massifs of the Vieng Phouka area are in general of lower elevation and of limited extend but they are strongly karstified and host significant caves, probably due to a different stratigraphy or diagenetic modification of the rocks then those in the Luang Phrabang province.

2.Caving Areas

An overview of caving areas is found in map 1. The most intensely investigated area is around the villages of Nong Khiaw and Ngoy Nua in the north-east relatively close to the Vietnam border. Two of the four expeditions focused on this area and a large number of caves have been found along the banks of the Nam Ou river. The Vieng Phouka district in the north-west has been only recently visited in February 2005. It revealed as an unexpected surprise the longest caves in northern Laos.



The Luang Prabang district was targeted in the 2003/04 expedition and searched for caves in a radius of about 50 km. Most of the 26 surveyed caves are 100-200 m long with the exception of the 1.6 km long Tham Loum. They show a great variety from caves with one straight passage to mazes and big chambers. Only a short trip was done to the Phou Khoum area about 100 km south of Luang Prabang with one cave completely surveyed. The area is still sensitive due to activities of Hmong rebels. The last section covers the Muang Nan area that was explored by the Dutch expedition in 2000.

Map 1: Caving areas in northern Laos.
A: Muang Ngoy/Nam Ou, B: Vieng Phouka,
C: Luang Prabang, D: Phou Khoum, E: Nan

2.1 Nam Ou Valley at Muang Ngoy

The investigated area is crossed by the wide Nam Ou river from the NE to the SW. Where the national road no. 1 crosses the river, the village of Nong Khiaw (named Muang Ngoy on the topographical map) is situated. The small district town is a transfer point where people arrive by car or bus and continue to travel up- or downstream on the Nam Ou by boat. These limestone areas were first investigated by the 2000 Dutch expedition and later by the German reconnaissance in 2002. Four caves were surveyed and a site with ancient rock paintings was visited. Restrictions made by the administrative representatives of Muang Ngoy forced the team to stop the exploration and to return to Luang Phrabang. They were allowed to continue as a joint project with the provincial forest department in the area around Muang Nan.

About 14 km upstream (north) of the town of Nong Khiaw the Nam Ou river crosses an approximately 20 km long and 15 km wide area of large limestone massifs that summit at 700 – 1,500 m and that are covered with a dense monsoon rain forest. The Nam Ou partly has created an extremely scenic gorge with breathtaking cliffs up to 600 m high. The village of Ngoy Nua is situated right in the middle of the Nam Ou gorge where the tributary creek of Nam Ngoy coming from the East joins the Nam Ou. Ngoy Nua is accessible by a 1 hour long boat trip from Nong Khiaw/Muang Ngoy only.

The longest cave along the gorge is the Tham Kham / Pageo (Holy image cave / Middle cave). The cave is reached in 30 minutes by foot from Ngoy Nua village along the creek Ngoy. The Tham Khan cave (520 m) has a wet lower entrance and a upper dry entrance. A sump is reached after about 200 m that certainly connects to Tham Pageo. This sump was free-dived for about 10 meters and two air-filled chambers were reached. However, no connection to Tham Pageo was made. UXO Laos (the regional explosives clearance project) has removed explosives from the cave. Traces can still be seen in Tham Khan.

The entrance to Tham Pageo (1,550 m) opens immediately east of the Tham Khan resurgence. The entrance and the subsequent 100 meters of phreatic passage are pretty low with less than one meter and filled by mud. Later the cave becomes walkable and two crawls and a duck have to be passed until the cave divides into an East/Northeast and West section. The later one ends in a sump that connects to Tham Khan. The East/Northeast section of Tham Pageo continues for another 500 m until it ends abruptly.

The 21 caves so far known along the Nam Ou can be subdivided in two groups:

- a.) Active river caves like the Tham Khan/Pageo and the Tham Doun's. These caves are flooded during the Monsoon.
- b.) Fossil caves that are situated about 50-150 m above the river of Nam Ou. These caves often have a rich calcite decoration and sometimes high contents of CO₂. The average length is about 100-200 m.

It has to be noted that during the expeditions caves with easy access mainly near the river were investigated exclusively. The upper cliffs and tops of the enormous karst plateaus still remain virtually untouched and a full-scale expedition will require exhaustive "jungle-bashing" in steep terrain.



Picture 1: View from Muang Ngoy Nua along the valley in northern direction into the main canyon.



Picture 2: Side passage of the Tham Nam Eng Resurgence with river and drip stone formations.

2.2 Vieng Phouka

The district village of Vieng Phouka is situated in the Luang Nam Tha province half-way along the road from Luang Nam Tha towards Huay Xai at the Thai border. In a few years the region will experience an economic boost due to a highway that is currently in construction between Thailand and China. Caves play an important role in the Vieng Phouka based eco-tourism project from the European Community and are visited in combination with trekking activities. The 2005 speleological investigations of the Dutch-German team were logistically supported in a generous way by providing transport and well-trained guides. Due to the excellent conditions the 2005 cave investigations led to important discoveries within a period of one week only.

The Tham Nam Eng is the best known cave in the area and used for eco-tourism. It is mentioned in several international guide books and also indicated on tourist maps from Laos. The guides pay great attention on the protection of the cave which is therefore looked. Waste has to be carried out and nothing should be left in the cave. Despite the intense use of the cave no systematic survey has been done and the guides visited only the known areas. Their fear to get lost kept them out of any new passages and exploration.

The cave is reached by a 1 hour drive on the dusty main road from Vieng Phouka to Luang Nam Tha just a few km further north from name giving village Ban Eng. It takes only 10-15 minutes to walk from the road eastwards to the base of the mountain ridge that hosts the Nam Eng system. It consists of the upper fossil cave of 3.1 km length and the lower active resurgence cave of 3.5 km length. Some of these passages are situated less than 100 metres from each other on a comparable level. However, no link between both caves was found. There are also several vertical shafts that ascend from the main passage of Tham Nam Eng (resurgence) that may connect both caves. Tham Nam Eng resurgence cave drains massive water during the wet season. The walls nearly of the complete cave show scallops with a diameter less than 1 cm. Dripstone formations are rare in Tham Nam Eng resurgence cave and can be found in the upper parts of higher passages only.

Other caves surveyed in the area are the Tham Nam Lot ("Tunnel cave", 1.4 km) and Tham Phou Pasat (645 m). They are located in an isolated ridge about 2,5 km north of Vieng Phouka. The active river cave Tham Nam Lot crosses the ridge and has at least 5 entrances.

The Vieng Phouka area offers probably the biggest potential in northern Laos. Several other caves were reported in the district unfortunately less close located to roads. The 3 hour intense jungle hike to Tham Phoulan on the last day surprised with a about 250 m long, 80 wide and 100 m high huge chamber. There was no time to survey in order to be back before sun set.

2.3 Luang Prabang District

Most of the caves in the vicinity of Luang Phrabang have easy access due to the well developed infrastructure near to the provincial capital. Furthermore the city of Luang Phrabang is a focal point of the local tourism. Consequently, caves play an important economic role. The Pak Ou caves are the most known tourist caves of Laos. They are situated on the western Mekong shore opposite the confluent with the Nam Ou, approximately 25 km upstream the Mekong from Luang Phrabang. The caves were visited by foreigners since 1867, when Douart de Langré first explored the Mekong. Both caves contain thousands of Buddha statues of different size. The statues are mainly made from wood. They are covered by leaf-gold in many cases.

Luang Prabang has two large 30 km long and 1,000 m high limestone plateaus located to the east and south that stretch from NE to SW direction. The search for caves was intensified around the plateaus and the Mekong. In total 26 caves with a total length of 4.1 km were surveyed and mapped. Most of them around 100 m of length.

The longest cave Tham Loum (Wind cave, 1.6 km) is found in the remote village of Longkhoay in the southern Phou Phaxang Noy plateau. The cave follows the axis of the limestone ridge from NE to SW. It consists of a single rift-controlled meandering gallery with no significant branches. Except of a small entrance with a strong current of air and few other crawls the entire passage is of walking size.

The second longest cave is the multi level river cave Tham Pha Man (405 m) north of Luang Prabang at the Mekong near Ban Man Phone Sai. A steeply descending but climbable passage gives access to a complicated maze of inter-connected phreatic passages on several levels. While the upper level of passages are decorated with calcite formations the lowest level reaches the static karst water level.

The eastern plateau of Phou Longhouay has only few short caves of 50-80m at its northern end at the Nam Pa river and on the plateau near Ban Long Kout. The Chompet district on the west side of the Mekong hosts the after the nearby

monastery named Tham Khou Ha Sakhalin (120 m). Furthermore an overnight trip was done 25 km upstream the Nam Kham river to Tham Kengkong (Crystal cave, 373 m) named after the nearby village.

The caves in the Luang Phrabang area surprise by its great variety from straight passages to large chambers and mazes mostly located high in the ridges of the mountains. Often CO₂ is present. The highest potential seems to be at Ban Longkhoay with 6 other caves mentioned by the villagers.

2.4 Phou Khoun

The T-junction of the north-south road 13 with the road 7 to the Plain of the Jars marks the location of the village of Phou Khoun. It takes 3 hours on the winding road 13 from Luang Phrabang until Phou Khoun is reached. The area was a showplace of Hmong rebels and a long time considered to be unsafe. Only recently the situation relaxed and the first time a permission was obtained in 2005 to visit the caves nearby. Nevertheless the local authorities insisted on certain safety measures and 3 soldiers and 2 policemen equipped with machine gun and pistols escorted us to the cave on the first day.

The Tham Seua (Tiger cave) – Nam Lot (Tunnel cave) system was originally known as two separate caves which could be successfully linked during the survey to one 2.7 km long system. It takes a 10 minute walk from the T-junction along the road 7 to about 200 m beyond the hospital until a footpath to the left is reached which descends to the valley with the caves. The entrances are found after another 45 minutes at the very end of the valley at the base of a north-east to south-west stretching mountain ridge. The system consists of the maze like Tham Seua that connects to the main river passage of Tham Nam Lot. A 60 m higher upper level with three separate entrances has several interlinked and richly decorated chambers. One passage descends steeply to the river passage. The river crosses the mountains and exits as a spring between boulders and blocks. An intense search for a crawl that connects to the river passage failed. Other caves further away were reported, but located in still unsafe areas and out of limits for the time being.

2.5 Muang Nan

The Muang Nan area is reached by a 1.5 h drive from Luang Phrabang. It has been intensely searched by the Dutch expedition in 2000. The longest cave is Tham Gia with 1.4 km length while Tham Thia has a remarkable depth of -105m and was once the deepest cave in Laos. In total 7 caves with 2.5 km passages are known.

3. Laotian tribes and Caves

There is a remarkable difference of the attitude of Laotian tribes towards caves. It varies greatly from area and tribe and is influenced by believes in ie. spirits, hunting tradition and war history. In general the first day in a new caving region is always the most difficult with any tribe. People do not understand the reason behind caving and are therefore reluctant to give information. But the cave survey techniques once shown are easy understandable and to draw a map in order to get not lost creates usually high confidence after the first day. Suddenly on the 2nd day the “known” caves in the area at least double.

The Hmong who live high in the mountains have the most practical attitude. Asked about cave entrances they know the exact locations, walking distances and even the approximately size of the cave. The most fascinating encounter we had in the 1.6 km long Tham Loum at the Hmong village Longkhoay south of Luang Prabang. Children use the cave as playground and we got greeted by a cherish group of about 10 boys and girls equipped with some candles and “one way” Chinese made torches in the remote parts of the cave.

The Khmu tribe settles along valleys and rivers and mix with the Hmong in villages. Answers like “the cave is huge – 1 day to walk in” can result in findings of few Buddha statues at the entrance of a 19 m long cave. This happened at Ban Nun Savat near Luang Prabang. Usually Khmu know the entrances, but not what is behind. Exceptions exist as always.

The influence of the Vietnam war is easily realized in the once heavily bombed region of Muang Ngoy Nua at the Nam Ou river. Villagers are very hesitant to reveal any information since the caves were used as shelters and hiding places during the war. Whole villages moved for several years to nearby caves and came only out at night to farm the fields. They believe in ghosts and bad spirits that still have influence on today’s life. Any visit of such a cave without the permission of the nearby village can have serious consequences. Beside still remains of weapons (UXO) might be present and the village knows about it.

Almost every village asks immediately for an official permission that must be issued from the provincial tourism office.

The reason may be in shifting responsibilities to higher authorities, because caves are in general considered dangerous. Guides always accompanied us for our safety.

4. Conclusion

The former unknown north of Laos slowly receives a face within the speological world. An overall of 25 km passages has been surveyed in the last 5 years with increasing success. A major cave region with a high potential has been found around Vieng Phouka in the Luang Nam Tha province. Future expeditions will focus on this area. A white spot are still the former cave shelters of the communistic resistance fighters at Viang Xai (Sam Neua).

5. References

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