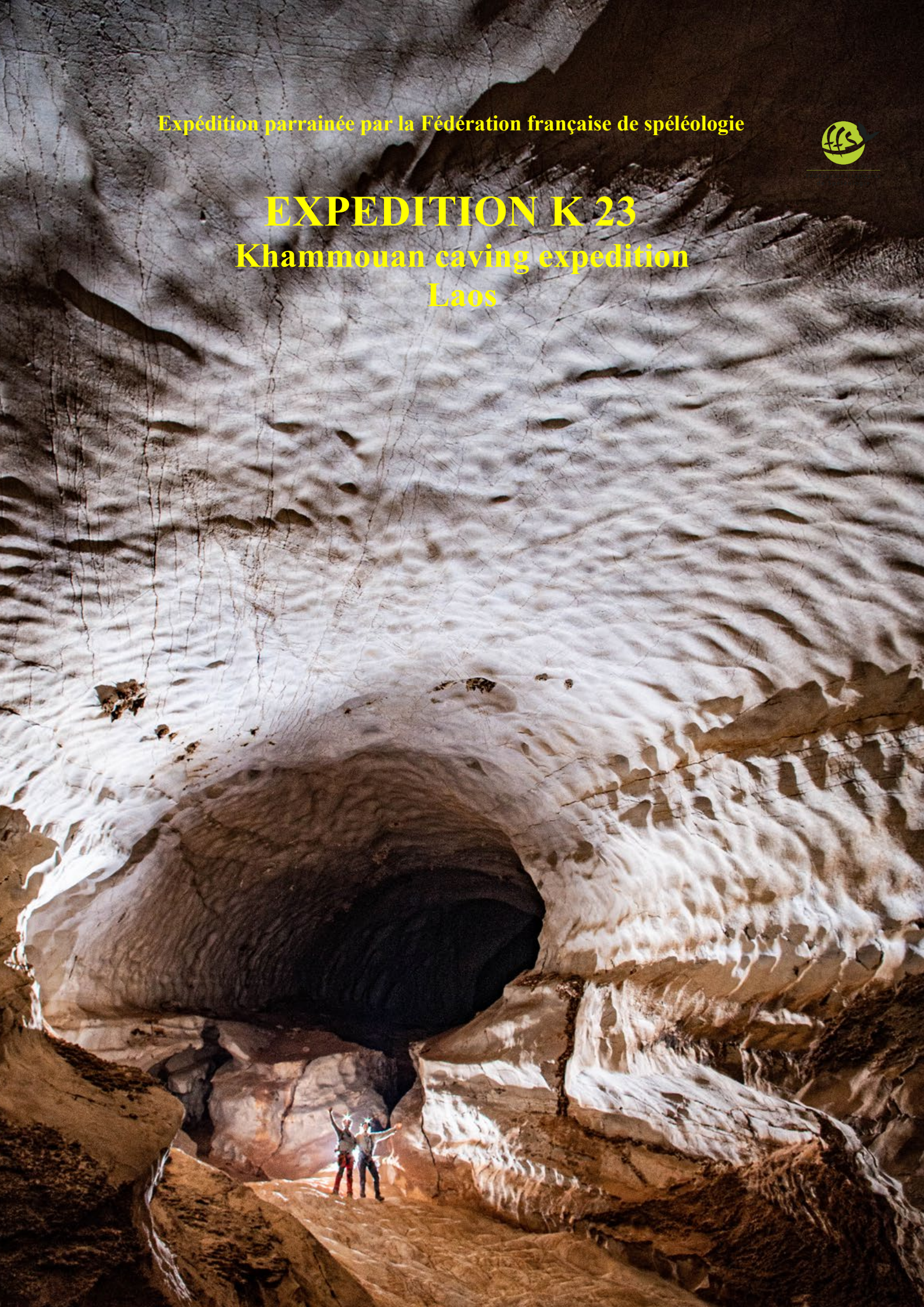


Expédition parrainée par la Fédération française de spéléologie

# EXPEDITION K 23

## Khammouan caving expedition

## Laos

# EXPEDITION K23

## Speleology in Khammouane
## Laos

**February 16 to March 5, 2023**
**Expedition sponsored by the French Speleology Federation**
**(N°4-2023)**

# Summary

K23 Expedition (n°4-2023) ..... 4

K23 การสำรวจ ..... 5

Location maps of the explored area ..... 6

History of cave explorations in the Nam Hin Boun valley ..... 8

Tham Houay Say ..... 11

Tham Van Ngo ..... 16

Tham Kadong Muay ..... 18

Other caves ..... 29

Tham Khamouk (or Tham Tamarind) ..... 29

Temple caves ..... 29

Caving in Khammouane: bibliography ..... 31

# K23 Expedition (n°4-2023)

**Country :** Laos
**Region** : Khammouane
**Association :** Explo-Laos
**Responsible :** Jean-Michel Ostermann, 9, rue Thiviers, 24 800, Corgnac-sur-l'Isle
**Participants :** Alexis Augustin (Leize Mendi), Page Ashwell (USA), Terry Bolger (Australie), Benjamin Doan (USA), Lucie Esclavard (G3S), Chloé Gombault (G3S), Bernard Lips (GS Vulcain), Josiane Lips (GS Vulcain), Jean-Michel Ostermann (G3S) responsable d'expédition, Serge Planes (Leize Mendi).
Dates : February 16 to March 5, 2023

The expedition, organized by the Explo-Laos association and sponsored by the French Speleology Federation, took place from February 18 to March 4, 2023 in the Nam Hin Boun valley, Khammouane province.
The topography of Tham Houay Say, in relation to a beautiful resurgence, was carried out in its entirety over 1166 m.

The explorations of Tham Van Ngo, known over approximately 2600 m, were continued and allowed the removal of numerous question marks. New promising passages were recognized with no stops due to lack of time. 451 m of galleries were surveyed there.

On the right bank, Tham Kadong Muay, which was explored by one of us a few years ago over approximately 1100 m, offered significant extensions through large galleries, bringing the total development of the cavity to 4710 m. (+115m). Interesting prospects exist there for future expeditions.

Nearby, Tham Pii Hao, which was indicated to us by our guides, has been mapped over 700 m.
Tham Makham, access to which is difficult, was recognized over approximately 600 m and two unanswered wells were lowered there.

Finally, a reconnaissance in the upstream areas of the underground Nam Non was intended to attempt escalations with a view to shunting the siphon and reaching the loss, Tham Song Dang. Sadly, none have been successful.
Despite a fairly short length of stay, a total of 7027 m of survey were carried out, including 4300 m of new cavities with great prospects for the next campaign.

The expedition could not have been successful without the support of the local authorities, whom we warmly thank, and especially the invaluable logistical assistance of Vicky and Thomas Wiser. We thank CDS 24 for its financial support for this project and CDS 47 for the loan of equipment.



*The team*

# K23 การสำรวจ

ประเทศ : ลาว

ภูมิภาค : คำม่วน

สมาคม : ระเบิด-ลาว

ผู้รับผิดชอบ : Jean-Michel Ostermann, 9, rue Thiviers, 24 800, Corgnac-sur-l'Isle

ผู้เข้าร่วม : Alexis Augustin (Leize Mendi), Page Ashwell (USA), Terry Bolger (ออสเตรเลีย), Benjamin Doan (USA), Lucie Esclavard (G3S), Chloé Gombault (G3S), Bernard Lips (GS Vulcain), Josiane Lips (GS Vulcain), Jean-Michel Ostermann (G3S) ผู้รับผิดชอบการเดินทาง, Serge Planes (Leize Mendi)

วันที่ : 16 กุมภาพันธ์ ถึง 5 มีนาคม 2566

การสำรวจซึ่งจัดโดยสมาคมสำรวจลาวและได้รับการสนับสนุนจากสหพันธ์วิทยาถ้ำฝรั่งเศส จัดขึ้นระหว่างวันที่ 18 กุมภาพันธ์ ถึง 4 มีนาคม 2566 ในหุบเขาน้ำหินบุญ จังหวัดคำม่วน

ภูมิประเทศของถ้ำห้วยทรายสัมพันธ์กับการฟื้นฟูที่สวยงามตลอดระยะทางกว่า 1,166 เมตร

การสำรวจถ้ำวันโงซึ่งรู้จักกันในระยะทางประมาณ 2,600 ม.
ยังคงดำเนินต่อไปและอนุญาตให้ลบเครื่องหมายคำถามจำนวนมากได้
ข้อความใหม่ที่มีแนวโน้มได้รับการยอมรับโดยไม่มีการหยุดเนื่องจากไม่มีเวลา มีการสำรวจภูมิประเทศ 451 ม.

ทางฝั่งขวา ถ้ำกะดงมวย ซึ่งพวกเราคนหนึ่งได้สำรวจเมื่อไม่กี่ปีก่อนเป็นระยะทางประมาณ 1,100 ม.
ได้ขยายส่วนสำคัญผ่านแกลเลอรีขนาดใหญ่ ส่งผลให้การพัฒนาของโพรงทั้งหมดสูงถึง 4,710 ม. (+115ม.)
มีแนวโน้มที่น่าสนใจสำหรับการสำรวจในอนาคต

บริเวณใกล้เคียง ถ้ำปีเฮา ซึ่งไกด์ของเราระบุไว้นั้นถูกแมปเป็นระยะทางกว่า 700 ม.

ถ้ำมะขามซึ่งเข้าถึงได้ยากมีความสูงประมาณ 600 เมตร และมีบ่อที่ยังไม่มีคำตอบอยู่ 2 บ่อถูกลดระดับลงที่นั่น

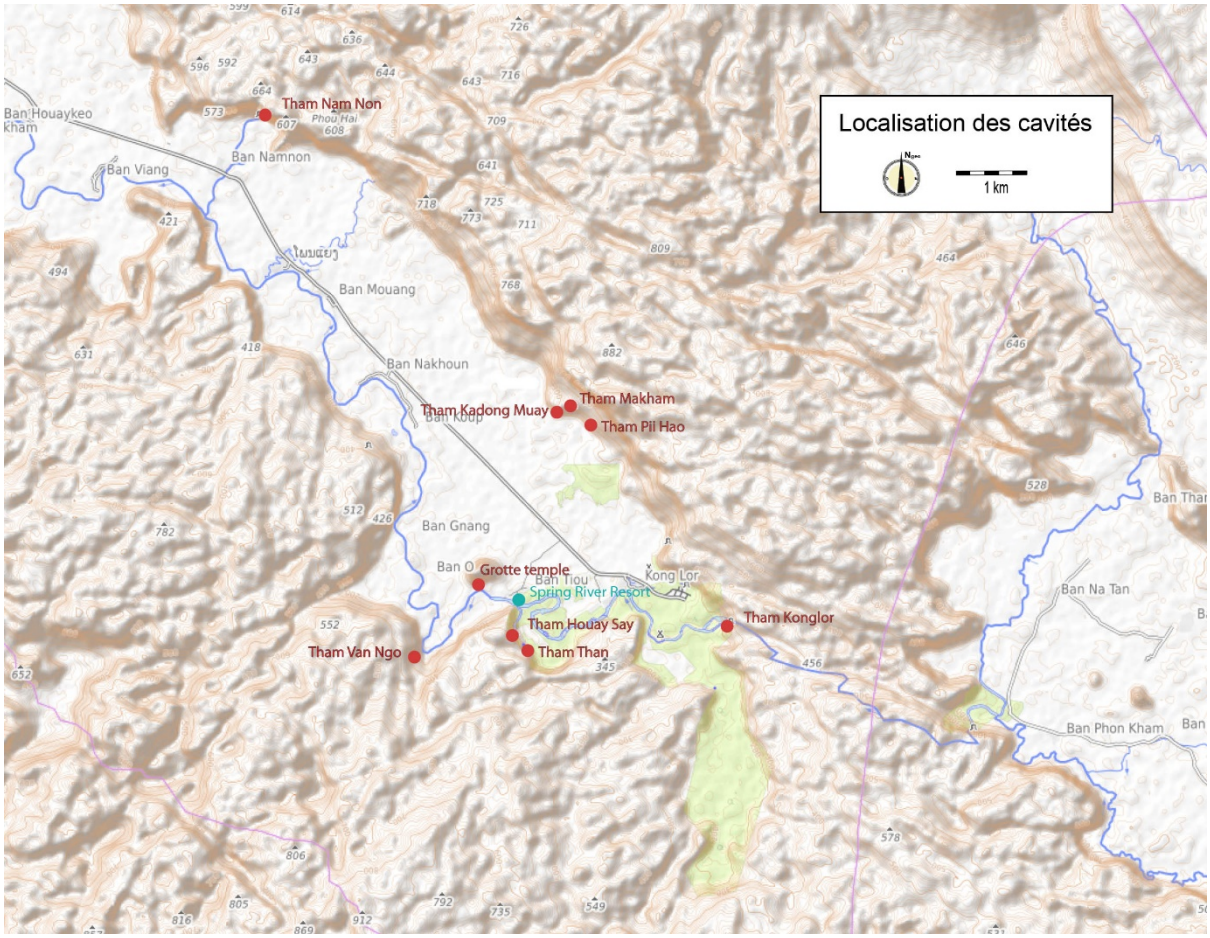
ในที่สุดการลาดตระเวนในพื้นที่ต้นน้ำของใต้ดินน้ำนอนมีจุดมุ่งหมายเพื่อพยายามยกระดับโดยมีจุดประสงค์เพื่อแยกกาลักน้ำและเข้าถึงการสูญเสียถ้ำสองแดง น่าเศร้าที่ไม่มีผู้ใดประสบความสำเร็จ

แม้จะมีระยะเวลาการพักค่อนข้างสั้น แต่ภูมิประเทศทั้งหมด 7027 ม. ได้ดำเนินการ รวมถึงโพรงใหม่ 4300 ม.
ที่มีแนวโน้มที่ดีสำหรับการรณรงค์ครั้งต่อไป

การสำรวจนี้ไม่สามารถประสบความสำเร็จได้หากไม่ได้รับการสนับสนุนจากหน่วยงานท้องถิ่น ซึ่งเราขอขอบคุณอย่างอบอุ่น และโดยเฉพาะอย่างยิ่งความช่วยเหลือด้านลอจิสติกส์อันล้ำค่าของ Vicky และ Thomas Wiser เราขอขอบคุณ CDS 24 สำหรับการสนับสนุนทางการเงินสำหรับโครงการนี้ และ CDS 47 สำหรับการยืมอุปกรณ์

# Location maps of the explored area






*Location of the cavities mentioned*

| Nom | X | Y | Z | Dvt topograhié | Dvt total |
|---|---|---|---|---|---|
| Tham Houay Say | 471483 | 1984929 | 200 m | 1166 m | 1166 m |
| Tham Van Ngo | 469824 | 1984788 | 196 m | 586 m | 2931 m |
| Tham Pii Hao | 472200 | 1988588 | 190 m | 755 m | 755 m |
| Tham Kadong Muay | 471835 | 1988742 | 180 m | 4710 m (+115 -11) | 4710 m |
| Tham Makham | 472266 | 1988750 | 350 m | | 700 m |
| Tham temple | 470692 | 1985935 | 210 m | | 30 m |
| Tham 2 | 470745 | 1985939 | 224 m | | 120 m |
| Tham 3 | 470798 | 1985960 | 228 m | | |
| Tham Nam Non | 467191 | 1993359 | 158 m | | 22130 m |
| TOTAL | | | | **7 217 m** | |

*Catalog of explored cavities*

## History of cave explorations in the Nam Hin Boun valley

Jean-Michel Ostermann

The first explorers of the region's caves were obviously the Laotians. Their interest in caves is multiple: they often serve as temples, but they come there to look for honey, phosphate, hunt, fish, and of course use them as a transport route, like Tham Konglor which connects two valleys.

Their agility and audacity are surprising, we saw it again this year. They do not hesitate to use bamboo and lianas to achieve their goal. We often found traces of human occupation in unlikely places, such as in the upper cliff exits at Tham Kadong Muay which they reached from the outside.

The first speleological incursions (although this activity only officially existed since 1888) are due to Auguste Pavie at the end of the 19th century. Pavie is responsible for finding routes of communication for political and commercial purposes between Siam (present-day Thailand) and Annam (Vietnam), this is the famous “Mission Pavie”. He explores the valley of the Nam Hin Boun and learns that near its source, the river crosses the mountain through a cave, while remaining navigable... He commissions Paul Cupet to explore the left bank of the Mekong. He took advantage of this mission to verify that the Nam Hin Boun actually crossed the mountain: on February 28, 1890, accompanied by Henri Counillon, he embarked at Ban Natan and crossed Tham Konglor by canoe.

Paul Macey (1908) made a summary description and plan a few years later. The example of this hydrogeological crossing will be taken up by geographers, such as Cuisinier (1928).

Although the karsts of Khammouane were the subject of speleological explorations during the colonial period (Cassan, Rachou, etc.), we do not find any mention of research in the valley, and we had to wait until the 1990s to that explorations resume, particularly due to the war and then the closure of the country.

In 1994 then 1997, 1999, and several times in the following years, C. Mouret began the survey of the underground Nam Non, and made a summary map of Tham Konglor.

A team from the F.F.E.S.S.M., therefore essentially focused on cave diving, will make 3 expeditions there (in 1997, 1998 and 1999) especially downstream of the valley. We owe them the exploration of Houay Sam Boun over 2273 m.

The Pyrenees Speleology Association has been interested in it since 1992, and carried out some great explorations (Tham Van Ngo over 2645 m, Tham Lom over around 4 km), especially on the left bank during the campaigns of 2002, 2003, and 2004.

In 2009-2010-2011, the Geokarst team carried out mainly diving-oriented missions. It makes the Tham Nam Non – Tham Song Dang junction via the 46 m siphon which separates the two cavities.

Several members of Explo-Laos explored in the valley from 2000, including a reconnaissance in 2004 during the rainy season by C. Ghommidh, and the campaigns of 2009, 2010, 2011,

2012, 2013, 2014. This will be an opportunity to continue explorations in Tham Lom and increase its development to 5900 m, and to discover several other important cavities: Tham Pha Lom (2690 m), Tham Bieo (3000 m), Tham Vang Phouang (2450 m), Tham Nam Péo (2100 m), Tham Pha Kouang (1600 m), …

Very busy with other major explorations in the region, we will temporarily leave the valley to return there in 2020 with a light team, in order to redefine the centers of interest there.

Over the years, our database has listed just over a hundred cavities in the valley. Many of them have question marks.

Bibliography

Association Pyrénéenne de spéléologie, 2005 : *Khammouane 2002-2003-2004. Rapport dactyl 157 p.*

Ardourel E., 2013 : Les Lao nous offrent Tham Kathoung. *Spéléo Magazine 82, 28-33.*

Ardourel E., Ghommidh C., 2015 : Tham Shouan Kao (Grotte du Vieux Jardin). *Expédition K13 et K14, spéléologie dans le Khammouane, Laos, Ed. Explo-Laos, pp 71-72.*

Ardourel E., Ghommidh C., 2015 : Tham Pouang, alias Tham PCF (petite conduite forcée). *Expédition K13 et K14, spéléologie dans le Khammouane, Laos, Ed. Explo-Laos, pp 73-74.*

Association Expé Laos, 2010 : Mission Laos N°2 2010. *Rapport dactyl. 90 p.*

Association Expé Laos, 2010 : Expé Laos 2011. *Rapport dactyl. 95 p.*

Cuisinier L. 1928 : Régions calcaires de l'Indochine. *Annales de Géographie, t. 38, n°213, pp. 266-273.*

Espinasse A., 1998 : Synthèse des explorations réalisées lors de l'expédition FFESSM- Laos 98.

*Le Fil, Bull. de liaison de la commission nationale Plongée souterraine, Féd. Fr. d'Etudes et de Sports Sous-Marins (FFESSM), n°4, pp 5-10.*

Galibert B., 2012 : Tham Pha Lom (la Grotte du Vent de la Montagne). *Laos 2011, Nam Dôn et Nam Hin Boun. Rapport d'expédition, Ed. Explo-Laos, pp 56-60.*

Galibert B., 2012 : Tham Nam Biéo (résurgence). *Laos 2011, Nam Dôn et Nam Hin Boun, Rapport d'expédition, Ed. Explo-Laos, p 68.*

Galibert B., Connes G., 2012 : Tham Biéo (La Grotte de Travers). *Laos 2011, Nam Dôn et Nam Hin Boun, rapport d'expédition, Ed. Explo-Laos, pp 65-67.*

Galibert B., Ostermann, J.M., 2015 : Petites cavités de la vallée de la Nam Hin Boun. *Expédition K13 et K14, spéléologie dans le Khammouane, Laos*, *Ed. Explo-Laos, pp 75-76.*

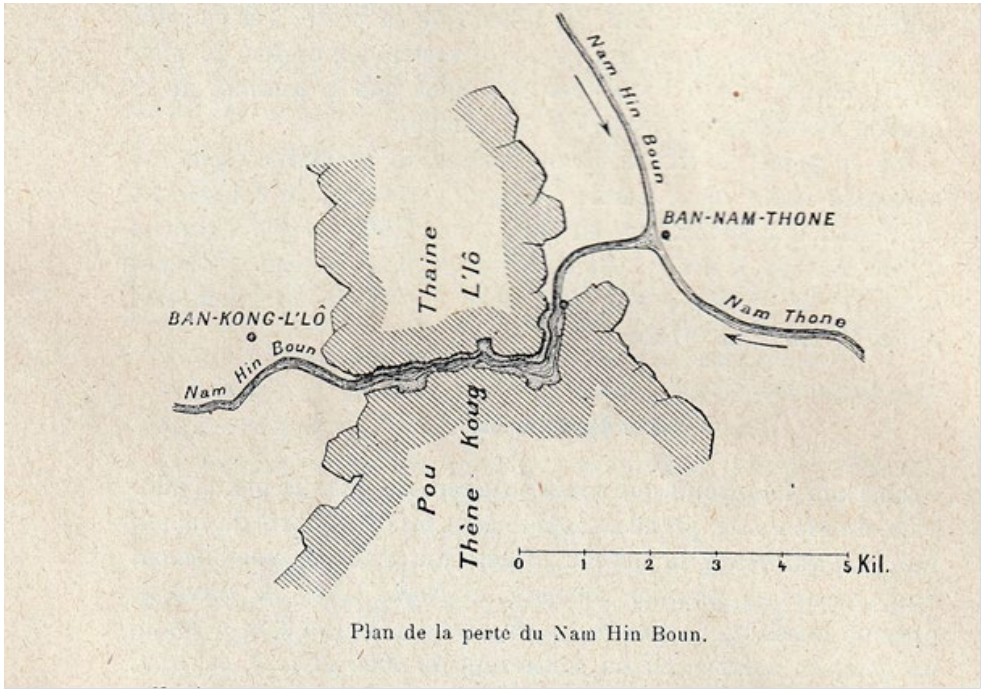
Ghommidh C., Brouquisse F., Galibert B., Ostermann J.., Connes G., 2012 : *Laos 2011, Nam Dôn et Nam Hin Boun. Rapport d'expédition Ass. Explo-Laos, 109 p.*

Ghommidh C., 2019 : La découverte des grottes-tunnels du Khammouane. *Petite Histoire de la spéléologie laotienne. Comm. Pers., 2 p.*

Macey P., 1908 : Cours d'eau souterrains du Cammon au Laos, *Spelunca, Bulletin & Mémoires de la Société de Spéléologie*, t. VII, 52.

Morieux G, 2000 : Laos 2000, *Fédération Française d'Études et Sports Sous-marins 18/02/2000 – 57 p.*

Mouret C., 2001 : Le karst du Khammouane au Laos central, dix ans de recherches spéléologiques, *Spelunca, 84, p. 7-32.*



Plan de la perte du Nam Hin Boun.

*Nam Hin Boun cave by Macey (1908)*

# Tham Houay Say

Bernard Lips, Chloé Gombault

## Access

The cavity is very close to the Spring River Resort. By canoeing up the left bank tributary in front of the establishment, you reach a resurgence after 500 m. The main entrance is located a few dozen meters above the Koun Houay Say spring.

To access the downstream entrance, you must locate the arrival of a “small dry valley” on the left bank of the tributary. This valley indicates that a resurgence must have been active at the foot of the downstream entrance.

To access the intermediate entrance, you must follow the cliff towards the south from the downstream entrance.

Coordinate details :

Main entrance: 48Q 471462.00 m E 1984917.00 m N alt 233 m

Intermediate entrance: 48Q 471409.00 m E 1985006.00 m N alt 208 m

Downstream entrance: 48Q 471367 m E 1985039 m N 251 m

Koun Houay Say (emergence): 48Q 471442 1984948 alt 228 m

## Historical

The cavity is quickly spotted by speleologists, because it is located above the beautiful resurgence of Koun Houay Say. Its modest development (around 1 km) and the few obvious prospects of continuing it mean that it will only be summarily surveyed in 2011 by the Géokarst team as part of their dives. They explore the siphon near the main entrance for 127 m, stopping at a narrow point. The gallery, however, heads north, hence the resurgence. The large lake is also submerged without a result being found.
Another topography was apparently carried out by Rolin in 2015 but has not been published to our knowledge.

## Description

The Tham Houay Say network develops above and in relation to a perennial flow, the emergence of which feeds a tributary on the left bank of the Nam Hin Boun.
In the dry period, it is accessed by canoeing up the river for approximately 500 m from the base camp at Spring River Resort, then progressing through the forest to the cliffs for around a hundred meters.
The cavity has 6 entrances generally oriented towards the North-East. The main entrance (at least, the largest) opens onto a setback 15 m high and 13 m wide. The gallery generally develops in a southwest orientation and gradually narrows until it reaches a width of around minus 5 m

about thirty meters from the entrance. At the narrowest point, you go up then down a series of steps. We observe pots of metric diameter and shallow depth, with remarkable corrosion.
Just after the projections, the gallery opens onto a first crossroads by crossing a fracture in the NE-SW direction. The gallery extends towards the SE on a non-penetrable fracture and a small siphon, on the SW side the fracture also closes, leaving only a small skylight in height (a climb is necessary, but its dimensions do not merit that we'll focus on it for the moment) as well as a hose halfway up which connects with the siphon.
We briefly change orientation for around fifteen meters by taking the fracture towards the NW. The latter opens onto the water table (same apparent level as the siphon) which requires progressing on rocky blades, on either side of this table view.
The NW-SE fracture then intercepts a second gallery generally parallel to the first (NE-SW direction) but with larger dimensions. Progression is also easier because it is less uneven.



*Corrosion in Tham Houay Say (JMO)*

On the NE side of the gallery, there is:

- a NE-trending diverticulum, which can be penetrated over a distance of around ten meters and which most probably joins the first gallery
- A chaos of calcified boulders rising to the north over a small skylight that opens onto the outside.
- Two N-trending fractures, of low development, which pinch into non-penetrable volumes for one, and aquatic volumes for the other.

The main development continues to the SW of the gallery.

Around 25 m from this new junction, a magnificent channel cuts through the gallery ceiling in a generally NW-SE direction, close to a 19 m-high chimney on the north side. The channel (an old intersecting gallery?) seems to offer departures from both the north and south walls.

Climbing on the north side is easy to do with a minimum of equipment and will help to clear up a question mark on a future expedition. On the right-hand wall, two diverticulae go down

for a few meters.

For the first two hundred meters, the ground limestone is bare and clean, dotted here and there with boulders of various sizes and scattered pebbles. On the whole, the cavity is very uneven, with many views of the water table.

We then come to a widening of the gallery reached by a step. The floor is covered by scree dotted with pools.

At the level of these small pools, in which tadpoles are frolicking, some already with legs, the gallery is wide and high. Two paths are possible:

* to the left, you can descend into a vast, boulder-strewn depression

* by staying on the right wall, you can go around huge boulders to find the start of an ascending gallery, which is quickly filled in. Once you've rounded the boulders, it's easy to return to the previous path. Impressive stalactites mark the junction between the two paths.

Progress is always hampered by boulders to climb over or around. Following the obvious, we tend to descend southwards to find ourselves at the edge of a large siphon-like water basin. We are at -10 m from the entrance. Before descending to the basin, it is possible to continue westwards through a comfortable skylight. We end up in two parallel north-south galleries, about 1.5 m wide. These galleries descend southwards, leading to siphoning basins. They are quickly filled in towards the north.

In fact, it's on the opposite side of the main basin and to the north that we need to look for the next section, which is fairly modest in size but has a noticeable draught. After a skylight and a short, easy climb, we reach a more comfortable, larger gallery. After 50 m of easy progress, the gallery splits off to the left. Heading back south, you can admire the "rotonde", a small concretion chamber with no continuation.

Continuing northwards, the gallery appears to be blocked by large boulders. In fact, these boulders can easily be bypassed to the right.

Shortly afterwards, a hollow a few meters deep on the right of the gallery, easy to descend, has no continuation.

After some sixty meters of comfortable gallery with a few bends, we come up against a large chaos of boulders:

* on the right wall, an easy descent leads to a small gallery. This gallery leads to the intermediate entrance. A short descent takes you back into the forest. The gallery continues a little to the south, leading to a narrow skylight. Returning to the boulder chaos, a small gallery on the left leads to a narrow, fairly deep fissure. Thrown pebbles end up in the water some 4 m below, i.e. around -10 m from the entrance. A low gallery extends beyond the fissure but has not been surveyed.

* on the left wall, you can go around the boulders, then climb down a few meters to find the continuation of the main gallery, which leads to a more complex area. Continuing downwards, you come to a large basin (-10 m from the entrance, like all the water in the cave)

and see the daylight of the downstream entrance, easily accessible by a short climb. Shortly before descending to the basin, you can visit a steeply ascending gallery (+6 m) that runs parallel to a fissure full of water. A stalagmitic flow leads up another parallel, steep gallery to a cliff entrance at +8 m, some 12 m above ground level. The northern end of this gallery is one of the highest points in the cave, at +12 m above the main entrance.

**Speleogenesis**

The cavity is the former conduit of the underlying emergence, with which it is still connected at various water points.

**Prospects**

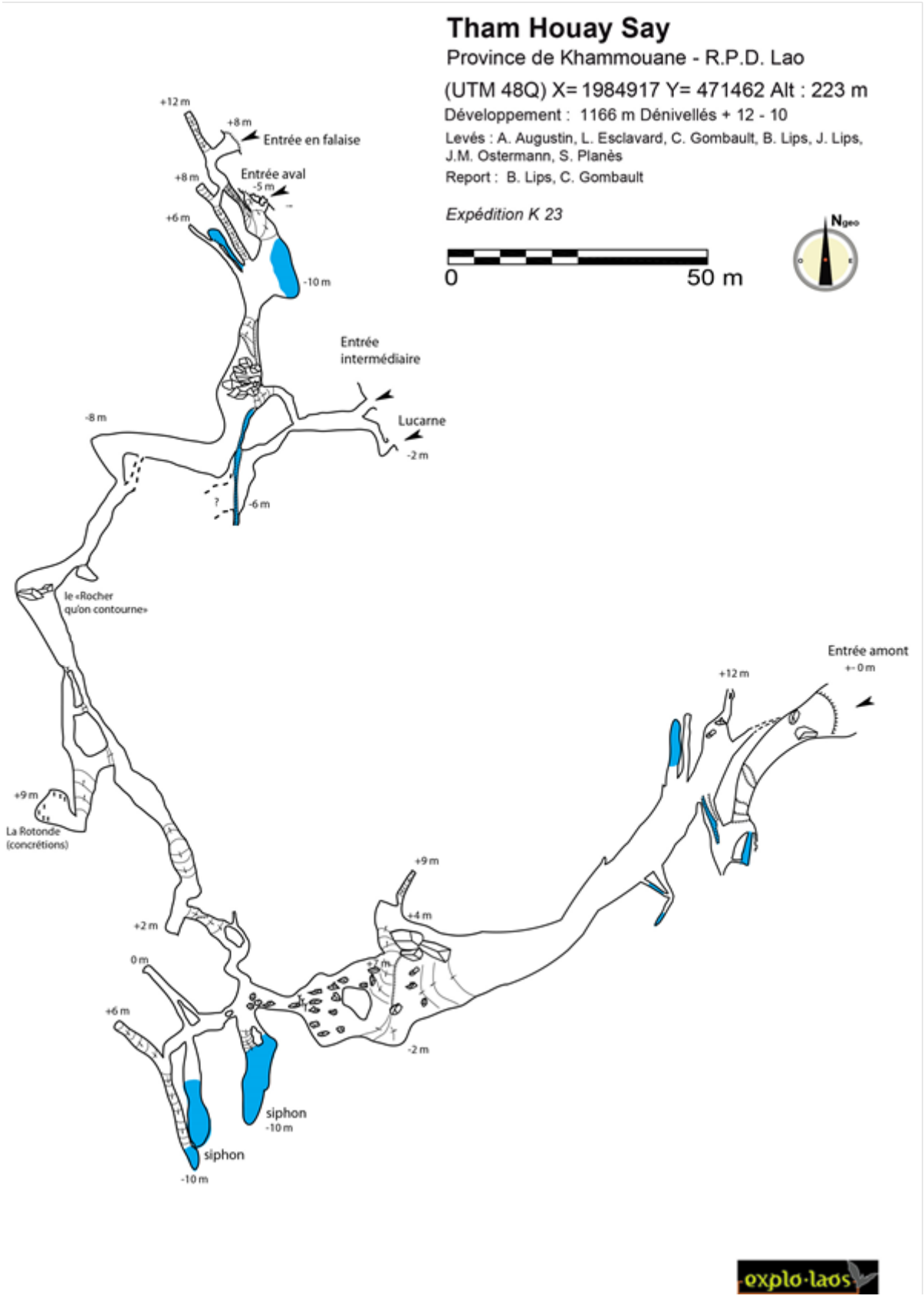
The only prospect probably lies in the climb identified in the entrance gallery, which seems to give access to a higher level. The result could be very interesting...



*Access to Tham Houay Say (JMO)*

**Bibliography**

Association Géokarst, 2011 : Expé Laos 2011. *Rapport dactyl. 95 p.*


Tham Houay Say
Province de Khammouane - R.P.D. Lao
(UTM 48Q) X= 1984917 Y= 471462 Alt : 223 m
Développement : 1166 m Dénivellés + 12 - 10
Levés : A. Augustin, L. Esclavard, C. Gombault, B. Lips, J. Lips, J.M. Ostermann, S. Planès
Report : B. Lips, C. Gombault
Expédition K 23
0
50 m
Ngeo
+12 m
+8 m
Entrée en falaise
+8 m
Entrée aval
-5 m
+6 m
-10 m
Entrée intermédiaire
-8 m
Lucarne
-2 m
?
-6 m
le «Rocher qu'on contourne»
Entrée amont
+- 0 m
+12 m
+9 m
La Rotonde (concrétions)
+9 m
+4 m
+2 m
0 m
+6 m
-2 m
siphon
-10 m
siphon
-10 m
explo·laos

# Tham Van Ngo

Chloé Gombault, Bernard Lips

## Access

From the resort's landing stage, a boat takes you down the Nam Hin Boun for about 2 km to the entrance, where a bend turns off to the north. From the landing point, it's just a few dozen meters to the cave entrance at the foot of the cliff.
Coordinates: 48Q X = 469824 Y= 1984788 Altitude 196 m

## History

The cave was explored by the Association Pyrénéenne de Spéléologie between 2002 and 2004. 2645 m of topography were surveyed. However, there are still many question marks. Subsequently, it is clear that several teams have visited the cave, but there are no published reports of new explorations.
Our forays enabled us to clear up a number of these question marks, and to explore new galleries in the entrance area. In the upper sections, untouched galleries were identified, but not explored for lack of time.

## Description of explored areas

The entrance gallery provides rapid access to a room with a left-hand ledge and access step. There are several starting points: the one opposite the access gallery leads after 150 m to an unexplored pit formed by a fracture oriented N130.
The base of the pit (P10) opens onto a large room (12 m wide, 20 m long, 5 m high):
- filled with a large orange-coloured sandy-silt filling
- affected by underdrawing, the low point of which is at the base of the pit

The filling affects the room lengthwise, forming a small canyon. We leave the room by climbing up an indurated, more or less calcified bench along the south wall. At the top, there is a 5 m-wide gallery, quickly interrupted by a ten-meter drop that leads to a second room with a stony surface.
On the south side, a maze of small penstocks leads to a flooded area. To the east, a wetting vault joins the network traversed by Lucie, Serge and Jean-Michel's team.

To the west, a seemingly promising gallery narrows and then branches off via a fault towards the drowned network already recognized by the maze of small penstocks mentioned above.
No big prospects to be expected on this side of the network.

From the entrance hall, a low passage to the north of the previous gallery leads to the "skylight", a small opening in the wall in the middle of an aquatic passage that allows you to continue your visit. After a few meters, this leads to a fork in the wall. Heading west, after 30 m we reach a crossroads to the north of which we follow a gallery, leaving a small gallery to the right, to arrive at the lake shaft we descended. A small 6 m pit
leads to a lake which, alas, is closed on all sides.

Returning to the previous crossroads, the south gallery leads to a ledge on the left, followed by

a low gallery that quickly joins a pond. Beyond this passage, we return to the section explored from the pit shortly after the entrance.

Returning to the skylight, at the next crossroads and heading north, we reach a new fork. The gallery on the right leads to a dead end, but the one on the left takes you up through a dry clay filling to another crossroads. From here, the upward gallery leads to a junction from which two galleries branch off to the right at around +60 m. These have been reconnoitered for several dozen meters without any obstacles, and should be continued...

**Prospects**

Our explorations enabled us to clear up a number of question marks, but many remain, as the cave has not been explored in its entirety. The most interesting point to emerge from our visit would be in the upper parts, with the gallery simply recognized at about mid-cavity.

**Bibliography**

**Association Pyrénéenne de spéléologie, 2005 :** Khammouane 2002-2003-2004. Rapport dactyl 157 p.



*Sailing on the lake (JMO)*

# Tham Kadong Muay

Alexis Augustin, Bernard Lips, Jean-Michel Ostermann

## Access

Coordinates: 48Q 471835 E 1988742 N Alt 180 m
The main entrance is about 3 km as the crow flies from Spring River Resort. After crossing the rice fields, you reach the foot of the cliff in a wooded area. It's easy to find the low, wide entrance by following the cliff.

## History

The cave was "discovered" by J.M. Ostermann and C. Mouret in 2004, who called it the "grotte sans nom" (cave without a name) for lack of a guidebook. We subsequently named it Tham Tunnel or Tham Lot in Laotian, and this year our guides gave us its local name, which means "cave of rodent bones". We say "rodent", as we were unable to identify the animal in question. Interestingly, in the deeper parts of the cave this year, we discovered the skeleton of a large rodent, probably a porcupine.
In March 2006, in the company of J. Rolin and H. Steiner, they discovered the intermediate fossil part of the cavity and stopped at several ventilated passages. Torch snags were discovered in this part, proving that we weren't the first... The topography was started, and continued in 2006 for a development of 1100 m, alas unpublished for lack of support. A large part of the "active" part and the lower fossil part were then covered. The Meringues pit was descended, but the gallery was not continued due to a lack of equipment for the short climb that followed. A pity, as it led to the next section...
It's possible that other explorations have been carried out in the cave, but to our knowledge no publication has been shared.
This year will see the discovery of some 3,600 m of new, large-scale galleries in what we'll call the "Upper Fossil". The absence of traces (inevitable in the passages used) attests to the virginity of the site at the time of our discoveries. The current development of the cavity is therefore 4700 m.

## Description

The main entrance is 11 m wide and 1.7 m high, giving access to a wide gallery whose floor is covered with a thick layer of dry mud. Traces of runoff, probably active during rainy periods, cut into this filling to a depth of 0.5 to 2 m in places.

To the south, on the right as you enter the cavity, the gallery leads to another, much smaller entrance, which must serve as an outlet during rainy periods.

To the north, on the left as you enter the cavity, a small diverticulum on the left leads, via a 50 cm-high gallery, to a third, even smaller entrance.

Shortly afterwards, on the right, a short but beautiful gallery quickly ends on a huge scree. An easy climb reveals that this scree blocks the entire height of the gallery.

Shortly after this gallery, we reach a more complex area:

The main path doesn't pose any orientation problems. The gallery has two bends, one to the right, the other to the left, and then it's just a matter of following the overcutting in the clay, leaving the side on the left:
- a wide start (a)
- a small gallery (b) corresponding to a loop from (a)
- a gallery (c), leading to a new entrance

and on the right :
- two small gallery starters, which are quickly filled in,
- a large gallery leading to the southern lake (d)
- a narrow passage in an area lit by a distant entrance (e)
- the start of the gallery leading to the upper levels (f)

Progress through this main gallery is particularly easy on a dry, often overcrusted deposit of earth. However, the ground becomes wetter shortly before the start of the gallery (f) and progress through the mud becomes difficult after this start. The gallery ends shortly afterwards on a siphoning lake (North lake). Thick, sticky mud makes it difficult to approach this lake.

Let's take a look at the various departures:

(a) Climb the earth bank on the left. To the east, a short gallery is quickly sealed off. Further north, a low passage gives access to a fairly substantial gallery, almost parallel to the main gallery. This soon leads to a first light shaft, due to an entrance a dozen meters higher up, not accessible, leading into the cliff (+14 m from the entrance). Shortly afterwards, a second shaft of light emerges from another very large entrance high above the ground (+19 m from the entrance), also probably leading off a cliff. It is this entrance that lights up the main gallery at passage (e). The rest of the climb is mostly on all fours over stony ground, and the main gallery is reached at point (b).

(c) A 30 m-long gallery leads to a scree entrance.

(d) A wide gallery heads east and quickly leads to a siphon-like water basin (the South Lake). Approximately halfway between the start of this gallery and the beginning of the basin, a small gallery can be accessed by climbing up the mud slope. This quickly leads to a 3 m drop, giving access to a conduit explored from (e).

(e) The area is illuminated by the cliff entrance at +19 m. The two parallel galleries are linked to this large cliff entrance by a high gallery which is difficult to access and has therefore not been explored. A narrow passage behind a large collapsed boulder leads to a room to the east of the main gallery. A flat passage leads into a small gallery ending in a new, small water basin. The gallery described in (d) leads to the top of this gallery.

Shortly before the north lake, a discreet but well-ventilated gallery (f) begins on the right. It's small in size, and even requires a few acrobatic moves over the first few meters. As it rises, the gallery quickly emerges, after a few oppositions, into a fossil network of the dimensions encountered in the active network. Here, we enter the lower fossil stage. Turning left into this network, the gallery rises a little further. After some fifty meters, it leads to a new entrance. Before this new entrance, two short galleries develop on the left.

# Tham Kadong Muay

Province de Khammouane - R.P.D. Lao

(UTM 48Q) X= 1988742 Y= 471835 Alt : 223 m

Développement : 4710 m Dénivellés + 115 - 11

Levés : A. Augustin, P. Ashwell, T. Bolger, B. Doan, L. Esclavard, C. Gombault, B. Lips, J. Lips, J.M. Ostermann, S. Planès

Report : A. Augustin, B. Lips, J.M. Ostermann

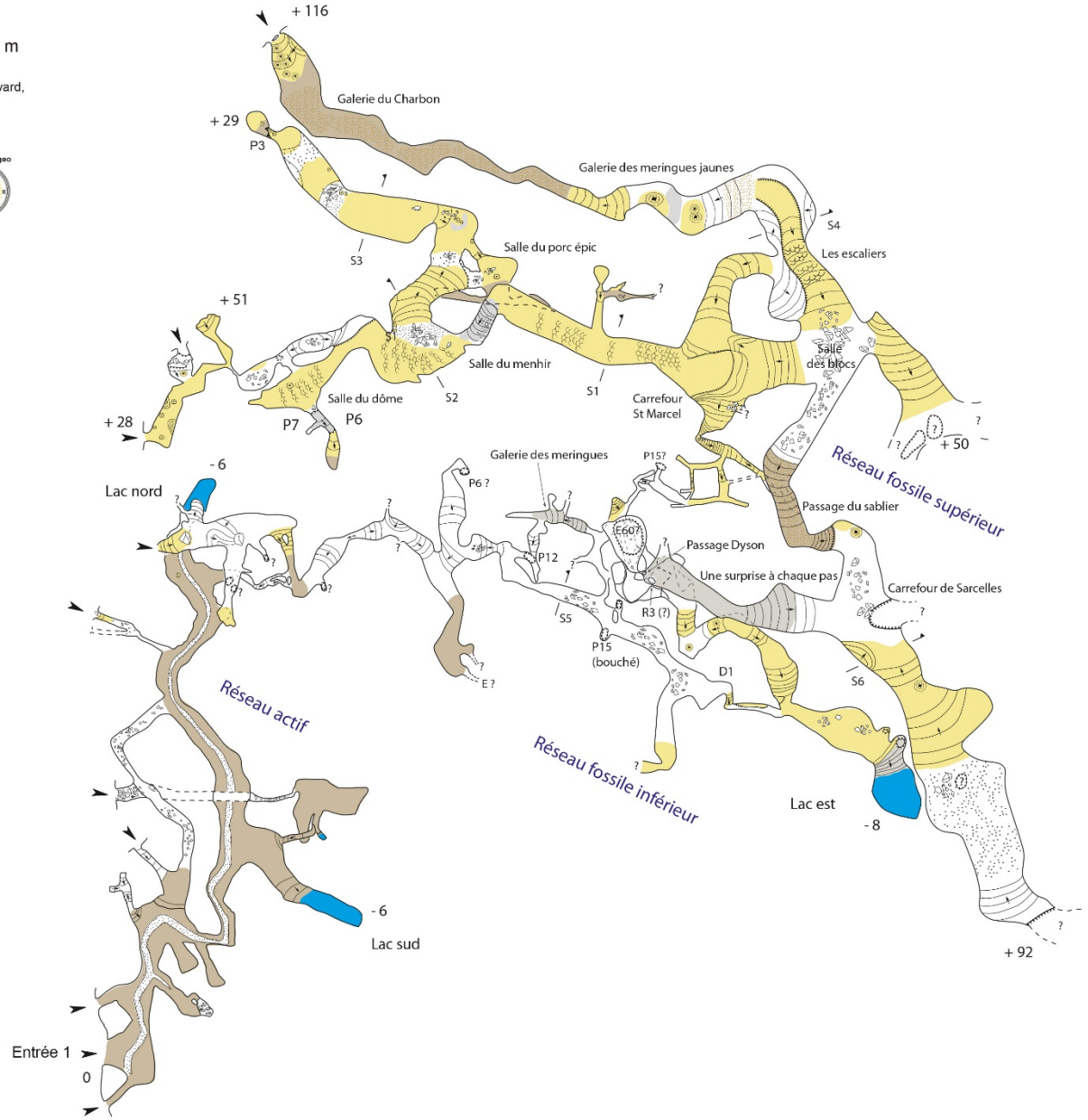
*Expédition K 23*

0 100 m

$N_{geo}$

Légende

- Calcite
- Argile
- Eau
- Mondmilch
- Stalagmite
- Gours
- Graviers
- Sable
- Entrée
- Cheminée
- Puits
- Escarpement
- Ressaut
- Blocs






The first quickly leads to an undescended pit. The second, a little longer, has two (unexplored) pits and ends in a calcite flow. It is highly probable that these pits communicate with the active network.

Turning right at the end of the connecting gallery, progress is easy in a gallery between 5 and 10 meters wide. Following the main path, the gallery, after some 100 meters of progress, comes to an obstacle requiring a climb (not carried out). Around 40 meters before this obstacle, an ascending gallery provides access to the rest of the network. At the top of the first slope, a fork appears. On the left, the gallery quickly reaches a small pit (not descended), estimated to be 6 meters deep. To the right, the ascent continues through a sandy area strewn with boulders. At a flat spot, a low gallery on the left leads to a 12-metre pit, which is not the best option for further progress. It's best to turn right to reach a nice-sized gallery. If you follow it, it continues for a hundred meters or so, then forks. On either side, the descent gradually begins. Clay and lakes make their appearance, as in the active network.

The key passage, giving access to the rest of the network, is on the left, some 50 meters before the last fork. It's a sandy upward passage, almost too narrow for Laos. However, it can be reached by returning to the exit and taking a small side gallery that leads to the Puits des meringues (P12), which joins the gallery of the same name. This is followed by a sometimes narrow, concretion-laden ascending conduit, with side galleries leading to unexplored pits (p15), but which gradually widens out until it reaches the huge St Marcel crossroads.

From here, three voluminous galleries emerge:

- The west gallery

This gallery, with its regular, arched vault, is lined with gours. Some fifty meters further on, a small gallery opens up to the north, continuing for a few dozen meters, stopping at a low but penetrable passage. The main gallery continues for another fifty meters or so, before reaching an angle to the south and lowering the vault. We come to a large filling of mondmilch and meringues at the top of a very sloping gallery which leads to the Carrefour du menhir (presence of a monolith with scree at the base of the gallery). Continuing west, after the scree, the gallery is again lined with large gours until you reach the Salle du Dôme. From this small room, a gallery starts to the south with two shafts of 7 and then 6 m, which are quickly blocked. A circular passage to the north of the room leads to an area of scree. Following the draught, a small gallery leads to a wide, concretioned area giving access to cliff exits to the west and north, accessible by risky climbing. We are at +28 m and +51 m respectively.

Back at the Carrefour du menhir, the vast gallery to the north is very steep and would require equipment, but a passage to the west allows us to reach the bottom where the skeleton of a large rodent has been discovered (the Porcupine chamber), from where a short clay gallery quickly becomes blocked on either side. The northern passage also leads to a wide, highly concretioned gallery which ends in a small, blocked 3 m pit.

From the St Marcel crossroads, two entrances lead to the north and east galleries. These are seamlessly linked. This is probably the former collector of the upper fossil network.

- The north gallery

Heading north along the gallery, whose walls are riddled with large erosion waves (over 30 cm in diameter), the ascent ends on a balcony overlooking the "stairs". The descent to the latter is tricky, however. Heading east from the St Marcel crossroads, you can easily reach the Salle des blocs (boulders chamber). From here, turn left and you'll quickly reach the "stairs", a succession of dry gours in an incised area. A little higher up, a concretioned area precedes the Galerie des Meringues Jaunes (meringues chamber). The next section descends a large calcite flow. At the foot of the latter, traces of coal indicate the presence of a hearth. A slight ascent takes us back into a very wide gallery, with erosion waves of consistently large dimensions. Charcoal graffiti covers part of the gallery on the right. After a bend to the right, daylight comes into view. A slight ascent through a calcite zone leads to this new entrance, the tenth in the network, at +116m.

- The East gallery

Back at the Salle des Blocs, the manifold expands southwards. But before continuing into this enormous gallery, another conduit runs east behind the room's largest boulders. It remains to be explored, pits are to be descended and other extensions are promising. Continuing along the manifold, the gallery inclines and the boulders give way to a sandy-clay matrix. It is this particularly unstable soil that we find on the ascent to the Passage du Sablier(the hourglass passage) . A little higher up, calcite and boulders appear again. Progress is easy as far as Carrefour de Sarcelles. A gallery to the east remains to be explored. Its access is defended by a projection to be equipped.

Heading west, a rising gallery continues. We'll come back to this later. The main axis continues southwards. Progress alternates between calcite, boulders and gravel. A bend begins to the left, and a short climb leads to a ridge overlooking a projection. A passage to the left would allow further exploration, but a handrail (estimated at some 15 m) is required. To be continued...

Back to the ascending gallery to the west of the Sarcelles crossroads. The mondmilch covers a large part of the ground from the first slope, and its presence becomes more pronounced in the gallery Une surprise à chaque pas (a surprise at every step). After some fifty meters, the gallery seems to be completely blocked, but a draughty sound surprise, all the more so as it is difficult to define its origin. A narrow opening in the floor, the Dyson passage, exudes this violent draught. It's not easy to get through, as clothing is not only narrow, but also clings to rocky asperities. Immediately afterwards, the generous dimensions take over again. A room comes into view, but no suite is visible around its perimeter. As we look up, we catch a glimpse of the potential continuation of our exploration. The start of a large gallery appears vertically, some sixty meters above our heads. A climb is in order. However, the first fifteen meters of poor-quality rock make this a complex undertaking.

**Speleogenesis**

The lower part of the cave is a series of conduits that are active during the monsoon season. In the dry season, there are several manholes connected to the base level, but there is also one at the lower fossil level. The galleries have a high clay fill, with a classic V-shape due to overburden excavation.

The overlying level, which we will refer to as the "Fossile inférieur” (Lower fossil), still contains areas of heavy clay filling, but also concretion. It is hydrologically connected to the eastern lake. Here, there's a main conduit enamelled with several scree zones due to

decompression.

Finally, the "Fossile supérieur" (Upper fossil) consists of wide phreatic galleries, with numerous corrosion waves and domes. Speleothems are abundant near the slopes, due to the reduced thickness of the overlying rock. The innermost galleries are topped by 500 m of limestone. Soils here are frequently covered with calcite or "meringue" mondmilch.

We are therefore in the presence of a very ancient network that was buried with the surrection of the massif, and was decapitated by the erosion of the slopes during the formation of the Nam Hin Boun valley, hence the number of entrances (10). This type of cavity is increasingly to be found in the Khammouane, with an active cavity surmounted by an ancient network with large volumes (Tham Kagnung in the Ban Vieng polje, for example). This indicates a loss of flow when the networks were buried, but also the existence of paleo-cavities formed by substantial flows. It has not yet been possible to determine the direction of flow.

**Biology**

Apart from the specific study reported elsewhere, it is interesting to discuss the discovery of the rodent in the beaver room: cephalic examination reveals that the teeth have grown out without being used, a sign that the animal has survived long enough. It probably entered the cavity through one of the entrances in the fossil network.

**Human occupation**

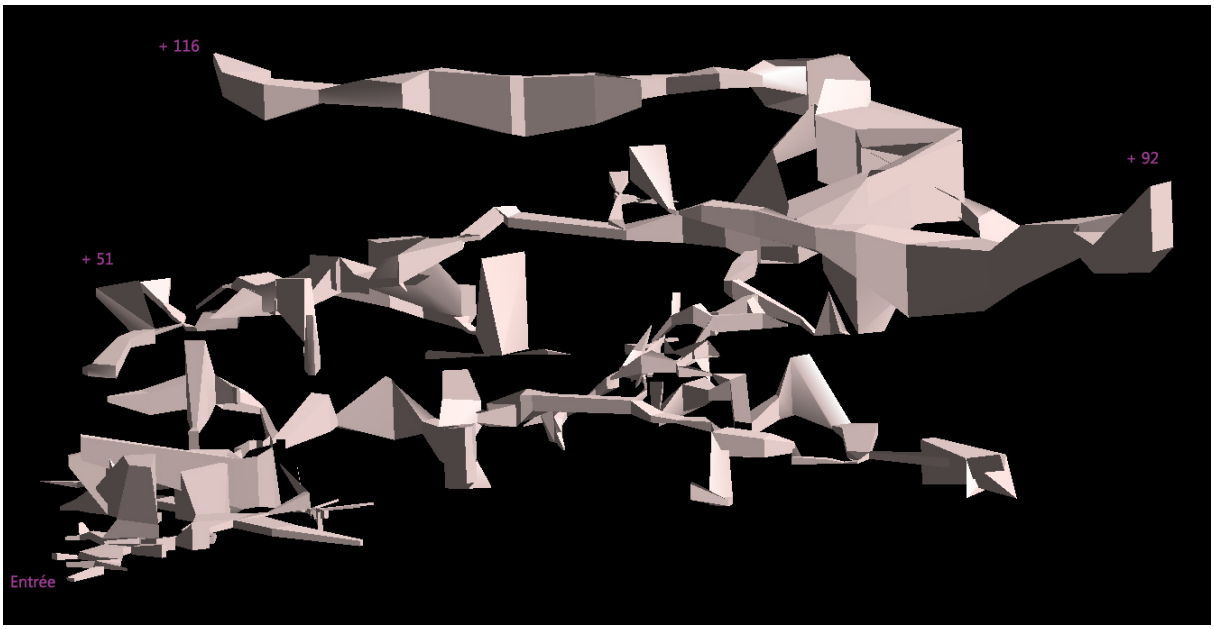
The active part of the cave is well known to the Laotians, who come here to fish and hunt. Contemporary graffiti can be seen in some of the lower entrances. On the other hand, it was surprising to find traces of human activity (footprints, torch wipes) in the upper entrances, which are very difficult to access from the outside. These traces fade as you go deeper into the cave.

**Prospects**

Exploration of this system appears to be in its infancy. In fact, there are many unexplored passages on the lower fossil level, and a few undescended shafts. For the time being, research has been carried out by following air currents. In the upper fossil level, explorations have come to a halt due to lack of time or minor obstacles (small shafts to be equipped) in four large galleries that plunge into the mountain... At the Dyson passage, we have access to a well-ventilated upward chimney, probably connected to the surface, but the sixty meters of climbing required to explore it do not make it a priority objective for the moment.

**Bibliography**

No publications mentioning the cave by any name (Tham Tunnel, Tham Lot or Tham Kadong Muay) have been found.




*Perspective view of Tham Kadong Muay*



*Partial view of the right bank massif (JMO)*



*Towards the Carrefour du menhir (JMO)*



*The Dome Room (JMO)*



*In the major galleries (AA)*



*Exit to + 116 (AA)*



*St Marcel Intersection (AA)*

# Tham Pii Hao

Serge Planès

## Access

UTM 48 Q coordinates: 472200 - 1988588 220 m
Located on the right bank of the valley, about 450 m southeast of Tham Kadong Muay along the cliff and 3 km from the resort.

## History

Topography by Chloé Gombault and Serge Planès on 25 /02 /2023, but this easily accessible cave is obviously often visited.

## Description

This cave opens out into a wide porch, 20 meters wide and 4 meters high, at the foot of a limestone rock bar that rises steeply from the right bank of the Nam Hin Boun River, 2 km from the riverbank. The riverbank consists of a long, wide silt plain on which rice is mainly grown during the monsoon season.
Progress through the cave is straightforward, with almost the entire journey made upright, in a gallery with a rounded profile, an average width of 5 to 6 meters, and a height of 4 to 6 meters, on loose soil.
The clay soil consists of more or less oily silt, with a passable channel in the middle of the gallery, while alluvial deposits pile up on either side (classic V-shaped profile).
In fact, in view of the recent plant waste heaped up here and there, the gallery probably floods with each monsoon, since the almost horizontal cavity has very little difference in level between the bed of the Nam Hin Boun and the entrance to the porch.
Schematically, a single 300-metre-long main gallery leads to a small lake some ten meters in diameter, with a 100-metre-long gallery to the left, also leading to a small lake, and a second gallery to the right, also some 100 meters long, leading to a third lake. The survey gives us a level surface for the 3 lakes.
A phenomenon is noted at the end of the main gallery, with a collapse room at the base of a shaft some twenty meters up, a shaft containing calcite flows, a sign of an active phenomenon in past eras.
A second phenomenon is noted in the secondary gallery on the left, which is probably quite close to the outside: a fracture in the ceiling revealing blocks on the ground or trapped high up, and a chimney some twenty meters long, which we did not attempt to climb.

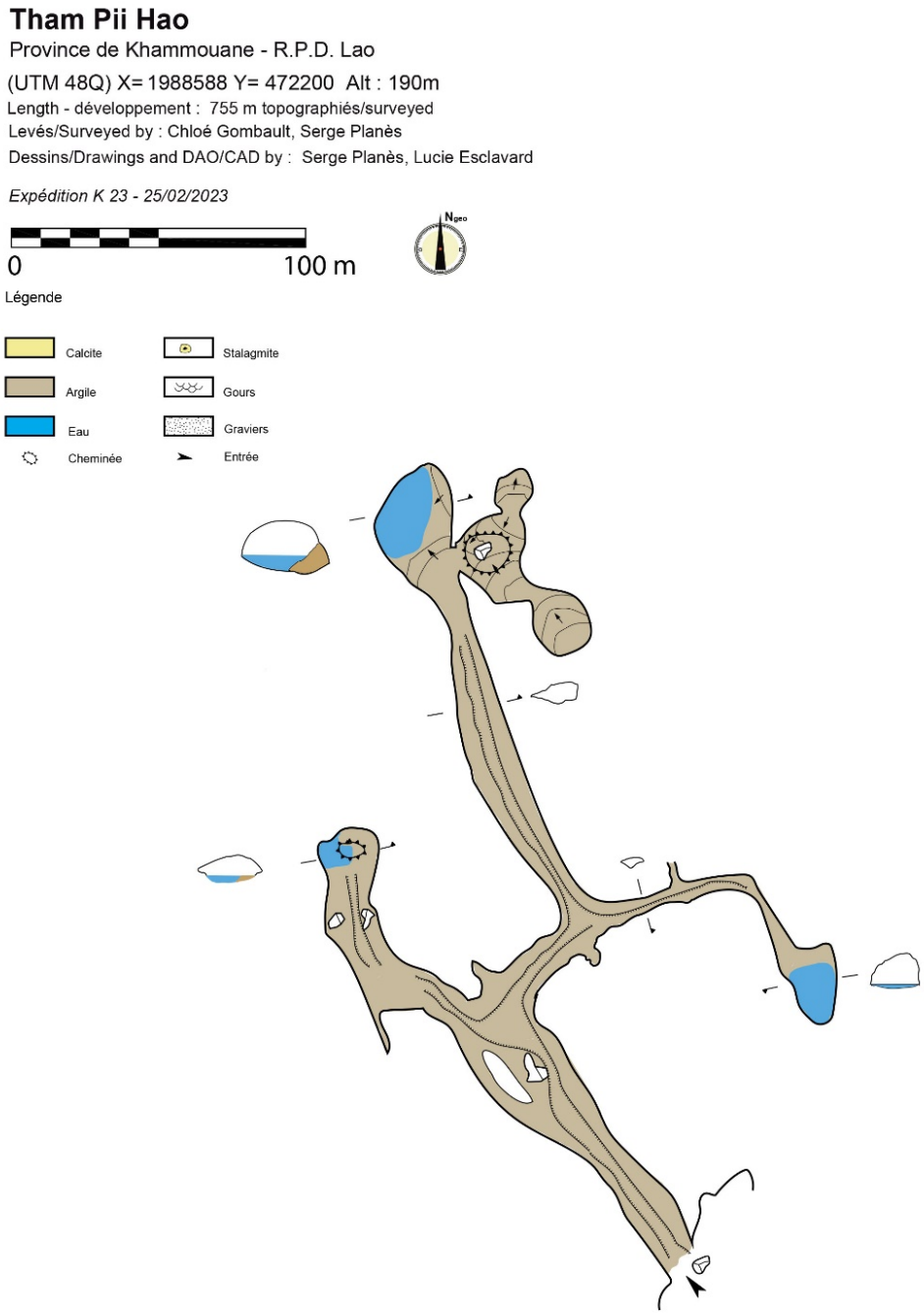
## Speleogenesis

This cavity is essentially hollowed out over a stratum joint crossing several diaclases, and probably formed by cliff-foot run-off during the monsoon season. It is also possible that it is

the remnant of a paleo network uncovered by erosion, and a connection with Tham Khadong Muay might then have been possible.

**Prospects**

Perhaps climbing to the bottom of the two galleries would reveal some extensions?



# Other caves

## Tham Khamouk (or Tham Tamarind)

### Access

Access is difficult without a guide, and even with one who doesn't know the entrance, as Josiane and Bernard experienced this year. You have to climb a vegetation-covered escarpment to the north-east of the Tham Kadong Muay entrance to reach a plateau at the end of which is the cave's wide entrance.

Coordinates 472266.29 m E 1988750.58 m N 350 m

### History

The cave, which is also well known to the valley's inhabitants, has not been published to our knowledge. There is another cave with a similar description, visited by the Association Pyrénéenne de Spéléologie team in 2002, then named Tham "X1" - MK31. The topography was carried out, but the notes were lost, so a memory sketch was published. The description mentions an undescended 20 m pit. However, the coordinates do not match, whereas the description of the cave entrance (large porch visible from the valley) could be that of Tham Khamouk...

During our expedition, Ben Doan and Page Ashwell visit the cave and descend the pit to another entrance. Another P15 mentioned on the 2002 survey has not been explored.

### Description

This is a large, wide-section gallery ending on a scree slope. A small meander to the north-west at the entrance leads to the 20 m pit which emerges outside.

### Speleogenesis and perspectives

Large paleo conduit intersected by the digging of the valley. It is very possible that this cavity is part of the same system as Tham Kadong Muay, given its proximity. It remains to carry out the precise survey and descend the P15.

## Temple caves

We call these three small caves located near the Sring River Resort, in the mogote about 500 m northwest of the hotel (Phou Xiangdoung). They are easily reached by taking a pirogue downriver, then walking to the foot of the hill.

The first cave is apparently a busy temple with stupa, but only extends for a few metres.
Coordinates X: 470692 Y: 1985935Z: 210 m

Heading east along the cliff, we find another cave with several entrances. It quickly leads to a 10 m-wide room with an upper passage leading to a gallery that is inaccessible without equipment. X: 470745 Y: 1985939 Z: 224 m

Finally, our guide points out another cavity along the cliff face, but he hasn't found it yet.

Bearing in mind that at Ban Dou we carried out 1 km of survey work and discovered vestiges of the war in a similar limestone piton, we think it would be worthwhile continuing our investigations here.



*Phou Xiangdoung (JMO)*

# Caving in Khammouane: bibliography


**Association Pyrénéenne de spéléologie, 2005 :** Khammouane 2002-2003-2004. Rapport dactyl 157 p.

**Association Géokarst, 2010 :** Mission Laos N°2 2010. *Rapport dactyl. 90 p.*

**Association Géokarst, 2011 :** Expé Laos 2011. *Rapport dactyl. 95 p.*

**Ardourel E., 2013** : Les Lao nous offrent Tham Kathoung. Spéléo Magazine 82, 28-33.

**Ardourel E., 2015**: Laos: progress in Houay Saï. Descent 247, 16-17.

**Ardourel E., Ghommidh C., 2015** : Tham Shouan Kao (Grotte du Vieux Jardin). *Expédition K13 et K14, spéléologie dans le Khammouane, Laos,* Ed. Explo-Laos*,* pp 71-72.

**Ardourel E., Ghommidh C., 2015** : Tham Pouang, alias Tham PCF (petite conduite forcée). Expédition K13 et K14, spéléologie dans le Khammouane, Laos, Ed. Explo-Laos, pp 73-74.

**Aubert Espinasse, 1998 :** Synthèse des explorations réalisées lors de l'expédition FFESSM - LAOS 98, 3p.

**Augustin A., Lips B., Lips J., Ostermann J.M., 2020 :** Expédition K19, Spéléologie dans le Khammouane, Laos. *Rapport d'expédition, Ed. Explo-Laos, 107 pages.*

**Bartholeyns JP, Camplo J, Cordier P, Fouquet J, Galéa L, Guillot F, Hof F, Lescure D, Olivier V., 2017 :** Expédition K17 poljé. *Rapport Explo-Laos, 98 p.*

**Benoit, 1998** : Rapport de l'expédition plongée spéléo Khammouane 97, *dactyl*., 34 p.

**Bence P., Audra P., 2006 :** Laos, karst de Khammouane. *Spelunca, 155, 5.*

**Bolger T., 2012**: Xé Ban Faï assessments for sustainable tourism development. Unpublished report, 22 p.

**Bolger T., Mouret C., Vacquié J.F. (2010)** : Echo des profondeurs, Asie du sud-Est, Laos, Vingtième expédition au Khammouane : Laos central 2010, *Spelunca*, 120, p. 12-14.

**Bolger T., 2019:** Xe Bang Fai Cave, Laos. *Encyclopedia of Caves, Elsevier, 1195-1192.*

**Brouquisse F., 1997 :** Données hydrogéochimiques sur quelques karsts du sud-est asiatique. *Proceedings of the 12th International Congress of Speleology, 1997, Switzerland - Volume 2 : 61-64.*

**Brouquisse F., Gregory A., Hedouin M., Preziosi E., 1999:** Catalogue of caves in the Lao People's Democratic Republic, *The International Caver*, 25, p. 13-16.

**Brouquisse F., - Mouret C., 1997** : Les écoulements karstiques du poljé de Ban Vieng, Laos Central, *Actes du 12e congrès International de Spéléologie*, La-Chaux-de-Fonds, Suisse, 2, p. 299-302.

**Brouquisse F., Mouret C., Vacquié J.F., 1997a** : Explorations spéléologiques au Laos 1991-1996 - *rapport de présentation des résultats*, dactyl.. 103 p.

**Brouquisse F., Collignon B., Mouret C., 1997b** : Reprise des explorations spéléologiques françaises au Laos : 1991-1996.- Spéléologie d'exploration lointaine - *Actes du IIe colloque européen de la spéléologie d'expédition*, Méjannes-le-Clap, Gard - mai 1996, Spelunca Mémoires N°22, 1997, p. 101-105.

**Brouquisse F., Lordon J., Mouret J.F., Vacquié J.F., 1997** : Echo des profondeurs, Asie, Laos, Explorations 1997 dans la province du Khammouane, *Spelunca*, 68, p. 5-9.

**Brouquisse F., 2001:** Escapade Khammouan 2001, *Spelunca*, 82, p. 8-10.

**Brouquisse F., Cholin A., 2002**: Khammouane 2002, Cave exploration in the Lao People's Democratic Republic, *The International Caver*, p. 4-14.

**Brouquisse F., Faverjon M., 2004** : Rapport d'expéditions au Khammouane, Laos central, 2002-2004, *dactyl.,* 186 p.

**Brouquisse F., 2008 :** République Démocratique Populaire Lao : quelques caractéristiques physico-

chimiques d'écoulements karstiques des régions de Khammouane et de Vieng Xai (province de Houaphan), *Actes Coll Vercors 2008*, 14 p.

**Cassan H., 1950** : Un spéléologue en Indochine, *Sciences et voyages,* XXXIIX[e] année, Nouvelle série, 59, p. 378-382.

**Cassan H., 1953** : À la conquête des dernières terres vierges d'Indochine, *Indochine, Sud-Est asiatique*, n°20, p. 23-27.

**Collignon B., Mouret C., Vacquié J.F. (1994)** : Echo des profondeurs, Asie, Laos, *Spelunca*, 55, p. 5-6.

**Coll. (2012)** : SCM – GSM – SC Comminges/APS – SSAPO – Aragonite – Abîmes, *Laos 2011, Nam Dôn et Nam Hin Boun*, dactyl., 121 p.

**Cuisinier L. 1928** : Régions calcaires de l'Indochine. *Annales de Géographie, t. 38, n°213, pp. 266-273.*

**Espinasse A., 1998 :** Synthèse des explorations réalisées lors de l'expédition FFESSM- Laos 98. *Le Fil, Bull. de liaison de la commission nationale Plongée souterraine, Féd. Fr. d'Etudes et de Sports Sous-Marins (FFESSM), n°4, pp 5-10.*

**Faverjon M., 2003** : Laos, l'expédition Khammouane 2003, *Spelunca*, 91, p. 5.

**Faverjon et al, 2011** : Collectif Khammouane 2010 - Spéléo Club Saint Marcellois, *Rapport spéléologique et scientifique, Khammouane 2010, Explorations spéléologiques en République Démocratique Populaire Lao*, dactyl., 138 p.

**FOMACOP (1996)** : Forest Management and Conservation Project, *LPDR caves project*, dact. 71 p.

**Foucard H., 1997** : Expédition FFESSM Laos 97, dactyl., 4 p.

**Galibert B., 2012** : Tham Pha Lom (la Grotte du Vent de la Montagne). Laos 2011, Nam Dôn et Nam Hin Boun. Rapport d'expédition, pp 56-60.

**Galibert B., 2012** : Tham Nam Biéo (résurgence). Laos 2011, Nam Dôn et Nam Hin Boun, rapport d'expédition, 68.

**Galibert B., 2015** : Tham Phé Pha Thon May (grotte du Radeau des arbres). Expédition K13 et K14, spéléologie dans le Khammouane, Laos, Ed. Explo-Laos, pp 33-34.

**Galibert B., Connes G., 2012** : Tham Biéo (La Grotte de Travers). Laos 2011, Nam Dôn et Nam Hin Boun, rapport d'expédition, 65-67.

**Galibert B., Ostermann, J.M., Salmon J.M., Ghommidh C, Guillot F., 2015 :** Autres cavités du poljé de Ban Viang. *Expédition K13 et K14, spéléologie dans le Khammouane, Laos,* Ed. Explo-Laos, pp 61-68.

**Galibert B., Ostermann, J.M., 2015** : Petites cavités de la vallée de la Nam Hin Boun. *Expédition K13 et K14, spéléologie dans le Khammouane, Laos*, Ed. Explo-Laos, pp 75-76.

**Ghommidh C., 2012** : Le mystère des cercles noirs. http://www.explo-laos.com/Explo-Laos/Les_cercles_noirs.html.

**Ghommidh C., 2012** : Le système Khoun Dôn – Houay Sai. Laos 2011, Nam Dôn et Nam Hin Boun, Rapport d'expédition, 31-31.

**Ghommidh C., 2012** : Accidentologie. Laos 2011, Nam Dôn et Nam Hin Boun, Rapport d'expédition, 107-109.

**Ghommidh C., 2014** : Echo des profondeurs, Laos, Expédition K14 (Khammouane 14), *Spelunca*, 136, p. 5-6.

**Ghommidh C., 2015** : La Nam Dôn souterraine. *Expédition K13 et K14, spéléologie dans le Khammouane, Laos,* Ed. Explo-Laos, pp 25-32.

**Ghommidh C., 2015** : Laos. *Commission des Relations et Expéditions Internationales Compte rendu d'activités N°24, p 12.*

**Ghommidh C., Guillot F., Quintilla R., 2015** : Expédition Khammouane 2015. *Rapport Explo-Laos, 23 p.*

**Ghommidh C., Steiner H., 2008 :** Xé Ban Faï 2007-2008. Explorations spéléologiques en RPD Lao. http://www.explo-laos.com/Explo-Laos/Utils_files/Rapport%20Laos%202007-2008.pdf

**Ghommidh C., Brouquisse F., Galibert B., Ostermann J.., Connes G., 2012 :** Laos 2011, Nam Dôn et Nam Hin Boun. Rapport d'expédition Ass. Explo-Laos, 109 p.

**Guizard L., 2015** : Expédition K 14: compte-rendu journalier. Expédition K13 et K14, spéléologie dans le Khammouane, Laos, Ed. Explo-Laos, pp 17-22.

**Hof B., Ostermann J.M., Guillot F., 2015 :** Expédition K 13 : compte-rendu journalier. Expédition K13 et K14, spéléologie dans le Khammouane, Laos, Ed. Explo-Laos, pp 12-16.

**Johnson K., Griffiths M., Wood K., 2017:** Scientific report. *In Rapport Explo-Laos, 98 p.*

**Kiernan K., 2009**: Distribution and character of karst in the Lao PDR. Acta Carsologica 38/1, 65-81.

**Limbert H., 2020:** Laos Expedition 2019 and 2020. *Unpublished report, 43 p.*

**Lips B., Lips J., Ostermann J.M., 2016 :** Expédition K16, spéléologie dans le Khammouane, Laos, *Rapport d'expédition, Ed. Explo Laos, 87 p.*

**Macey P., 1908 :** Cours d'eau souterrains du Cammon au Laos, *Spelunca, Bulletin & Mémoires de la Société de Spéléologie*, t. VII, 52.

**Morieux G, 2000** : Laos 2000, *Fédération Française d'Etudes et Sports Sous-marins 18/02/2000 – 57 p*

**Mouret C., 1993** : Les explorations et reconnaissances de 1992. *Spelunca* 52, 4-6.

**Mouret C., 1994**: The karst of Khammouane, central Laos. XI Congrès Int. UIS, Beijing, 43-44.

**Mouret C., 1997**: Actes 12e congrès Int. de spéléologie, La Chaux de Fonds, 6, 61-63.

**Mouret C., 1999**: Echo des profondeurs, Asie, Laos, sixième campagne au Khammouane, 7 au 23 février 1998 : près de 59 km topographiés de 1992 à 1998, *Spelunca*, 71, p. 7-12.

**Mouret C., 2000a** : Les grands poljés du karst du Khammouane, Laos Central, *Actes explo*, 2000, Belgique, p. 83-89.

**Mouret C., 2000b** : Les grands volumes souterrains du karst du Khammouane, Laos Central, *Actes explo*, 2000, Belgique, p. 79-82.

**Mouret C., 2001** : Le karst du Khammouane au Laos central, dix ans de recherches spéléologiques, *Spelunca*, 84, p. 7-32.

**Mouret C., 2001**: The formation of larges chambers, with exemples from Laos and other countries.*13e Int. congres UIS,* Brazilia, actes résumés, p. 108.

**Mouret C., 2001**: Hyperpoljes and ring poljes*. 13e Int. Congres UIS*, Brazilia, actes résumés, p. 56-57.

**Mouret C., 2001**: Scientific and human activities during cave and karst exploration in Laos. *13e Int. congres UIS*, Brazilia, actes résumés, p. 186-187.

**Mouret C., 2005**: Main 2001 to early 2005 results on the karst ok Khammouane, central Laos : long caves, sloping caves, hollow stalagmites and others, *Actes du 14e congrès International de Spéléologie*, Hellenic Speleoloviçäl Society, p. 411-414.

**Mouret C., 2017**: The Genesis of Hollow Stalagmites in Caves of the Khammouane Karst, Laos. *Proceedings of the 17th International Congress of Speleology 343-346,*

**Mouret C., 2017**: Contribution to Cave Tourism Promotion in Lao. *Spéléo-Club de Paris éd., Proc. 21rst Rencontre d'Octobre, Saint-Robert, p137-142.*

**Mouret C., Collignon B, Vacquié J.F.,** 1994 : Laos. Deux rivières souterraines hors du commun. *Spelunca, n°55, p.5-6.*

**Mouret, C., Vacquié, J.-F. 2011 :** Une remarquable grotte bouddhique redécouverte, Tham Pha Noi, karst du Khammouane, Laos. *Spéléo-Club de Paris éd., Proc. 21rst Rencontre d'Octobre, Saint-Robert, p137-142.*

**Mouret, C., Vacquié, J.-F. 2011 :** Un militaire dans les karsts du Laos, Vannivong Soumpholphakdy (1937-2012). *Spéléo-Club de Paris éd., Proc. 22nd Rencontre d'Octobre, La Caunette, Spéléo-Club de Paris, p121-131.*

**Mouret C., Collignon B, Vacquié J.F., Lagarde C., 1996**: Laos: la Xé Ban Faï souterraine, 90 ans après... une autre rivière souterraine géante. *Spelunca* 62, 20-22.

**Mouret C., Brouquisse F., Vacquié J.F., Lordon J., 1997** : Laos 1997, explorations dans la province de Khammouane. *Spelunca* 68, 5-9.

**Mouret C., Collignon B, Vacquié J.F., 1997** : Giant underground rivers in central Laos. Actes 12e congrès Int. de spéléologie, La Chaux de Fonds, 4, 57-60.

**Mouret C., Lapointe P**., **2009:** Mineralogy of chemical deposits in hypogenic Phi Seua cave, Khammouan, central Laos. ICS Proceedings 15th International Congress of Speleology 312-317.

**Mouret C, Ostermann J-M, Khamlasy K,** 2001: Un marqueur de l'évolution du karst du Khammouane, Laos Central: Tham Phi Seua. Spéléo-Club de Paris Publ., Proc. 11th Rencontre d'Octobre, 73–77.

**Mouret C., Bonnet O., Guichard E., Lordon J., Nogues X., Noiriel C., Ostermann J.M., Vacquié J.F., 2002** : Laos : explorations 2002 sur les karsts du Khammouane et de Laksao, Laos central. *Spelunca* 92, 7-11.

**Mouret C., Nogues X., Noiriel C., Vacquié J.F., Lordon J., Guichard E.,** 2003 : Distribution des écoulements dans la partie centre-nord du karst du Khammouane, Laos, à la latitude des rivières Nam Bout et Nam Pakan. Actes XIII° Renc. D'Octobre, St Christophe la Grotte, Spéléo-Club de Paris, 94-100.

**Mouret C, Ghommidh C, 2004** : Découverte d'une grotte exceptionnelle au Laos: Tham Pa Fa (Khammouane). Spéléo-Club de Paris Publ., Proc. 14th Rencontre d'Octobre, 58–62.

**Mouret C., Vacquié J.F.,** 2011 : La rivière souterraine géante de Tham Xe Bang Fai. *Spelunca* 119, 35-45.

**Mouret C., Vacquié J.F., 2011** : Echo des profondeurs, Asie du Sud-Est, Laos, Laos central 2011-1, vingt et unième expédition au Khammouane, *Spelunca*, 122, p. 6-8.

**Mouret C., Vacquié J.F., 2001** : Ten years of cave exploration in Khammouane, central Laos. *Actes explo*, 2000, Belgique, p. 75-78.

**Mouret C. , Vacquié J.F., 2013** : The discovery of caves in Khammouane, Laos (1991-2013). 2013 ICS Proceedings, Brno 2013, 81-87.

**Mouret, C., Vacquié, J.-F., 2012 :** Un militaire dans les karsts du Laos, Vannivong Soumpholphakdy (1937-2012). *R. d'Octobre, Spéléo club de Paris, La Caunette, p. 121-131.*

**Ostermann J.M., 2005 :** Spéléologie au Laos-2000. *Perigord Explo, Bull. G3S Périgueux, 8, 21-26.*

**Ostermann J.M., 2012**: Tham Cactus. Laos 2011, Nam Dôn et Nam Hin Boun. Rapport d'expédition, p 64.

**Ostermann J.M., 2013:** Expédition K13-Spéléologie au Khammouane. *Ed. Blurb,* 100 p.

**Ostermann J.M., 2013:** Spéléothèmes originaux du Khammouane, Laos: perle de caverne. Spéléo Magazine 84, 30-31.

**Ostermann J.M., 2014 a:** Spéléothèmes originaux du Khammouane, Laos: Phytokarst.

*Spéléo Magazine* 85, 32-33.

**Ostermann J.M., 2014 b:** Spéléothèmes originaux du Khammouane, Laos: Stalagmites creuses et bordures. *Spéléo Magazine* 86, 32-33.

**Ostermann J.M., 2014 c**: Spéléothèmes originaux du Khammouane, Laos: Mondmilch, crêtes et anémolithes. *Spéléo Magazine* 88, 28-29.

**Ostermann J.M., 2015 a**: Le poljé de Ban Viang. Expédition K13 et K14, spéléologie dans le Khammouane, Laos, Ed. Explo-Laos, pp 38-40.

**Ostermann J.M., 2015 b**: La perte de Tham Houay Saï/ Tham Dan Ngu. *Expédition K13 et K14, spéléologie dans le Khammouane, Laos,* Ed. Explo-Laos, pp 41-42.

**Ostermann J.M., 2015 c**: Tham Lô, éléments de climatologie. *Expédition K13 et K14, spéléologie dans le Khammouane, Laos,* Ed. Explo-Laos, pp 79-81.

**Ostermann J.M., 2015 d**: Observations archéologiques. *Expédition K13 et K14, spéléologie dans le Khammouane, Laos,* Ed. Explo-Laos, pp 82-83.

**Ostermann J.M., 2015 e**: Tham Rak (grotte des racines). *Expédition K13 et K14, spéléologie dans le Khammouane, Laos,* Ed. Explo-Laos, p 36.

**Ostermann J.M., 2017 :** Tham Lô, joyau du Khammouane (Laos). *Spelunca* 148, p.11-20.

**Ostermann J.M., 2019 :** Laos, expédition Khammouane 2019. *Spelunca 104, 7.*

**Ostermann J.M., 2023** : Expédition Khammouane 2023. *Spelunca* 170, p. 8.

**Ostermann J.M., Mouret C. 2004** : Découverte de figurations pariétales dans les grottes et abris du Khammouane, Laos central, *Spelunca*, 96, p. 35-43.

**Ostermann J.M., Rolin J., 2006 :** Tham Houay Kap, une percée hydrogéologique du Khammouane, Laos central. *Périgord Explo, Bull. G3S Périgueux, 10, 25-28.*

**Ostermann J.M., Galibert B., Ghommidh C, Guillot F., Salmon J.M., 2015 :** Tham Lô. *Expédition K13 et K14, spéléologie dans le Khammouane, Laos,* Ed. Explo-Laos, pp 45-60.

**Ostermann J.M., Ghommidh C, 2015 :** Spéléothèmes originaux du Khammouane, Laos : Spéléothèmes circulaires plans. *Spéléo Magazine* 89, 34-35.

**Roberts N., 2015:** The Cultural and Natural Heritage of Caves in the Lao PDR: Prospects and Challenges Related to Their Use, Management and

Conservation. The Journal of Lao Studies, Special Issue 2015, pps 113-139.

**Steiner, H., 2008 :** Höhlenforschung in Laos, *Jahresbericht der Höhlenforschergruppe Rhein-Main, Jg. 24, 2006-2008, S. 71-80*

**Valenas L., 2017 :** Rapport de l'expédition spéléologique internationale du projet Pha Soung 2017. *Eurospéléo 3, 37-39***Valenas L., 2018 :** Sistemul Pha Soung_ Laos 2016. *Speomond 19, 2-11.*

**Valenas L., 2019 :** The mystery of the ancient statues of Laos caves, *NSS News, Vol.77, n° 1, p. 20-21.*

**Valenas L., 2023 :** Speleo Laos 2023. *Spelunca* 171, p.4-6.

**Varin M. ; Faverjon M., 2010 :** Esplorando il Phou Nonglouang. *Speleologia N°63 : 46-53.*

**Waltham T., Middleton J., 2000**: The Khammouane karst of Laos. *Cave and Karst Science, 27, 3, 113-120.*

Fédération Française de Spéléologie
Commission Relations et Expéditions Internationales

CREI

## ***ATTESTATION*** 4 / 2023

Je soussigné, Gaël KANEKO, Président de la FFS, certifie exacts, les renseignements ci-dessous concernant l'expédition

**KHAMMOUANE 2023**

composée de 7 personnes tous membres de la Fédération Française de Spéléologie.

*(I, undersigned, certify the undermentioned indications concerning the expedition KHAMMOUANE 2023 consisting of 7 people, all members of the French Federation of Caving)*

Responsable de l'expédition : **OSTERMANN Jean Michel**
*Surname, Firstname and address* 9 rue Thiviers
24800 CORGNAC SUR L'ISLE

*Email :* jmostermann@yahoo.fr

Lieu de l'expédition (Pays, région, massif) : **LAOS**
*Expedition place (Country, Area, Massif)* **KHAMMOUANE**

Dates de l'expédition : **16/02/2023 AU 04/03/2023**
*Expedition dates*

Noms et Prénoms des membres de l'expédition :
*Full name of the expedition members*
Jean-Michel OSTERMANN, Alexis AUGUSTIN, Bernard LIPS, Josiane LIPS, Serge PLANES, Chloé GOMBAULT, Lucie ESCLAVARD,

Après examen du dossier, il a été décidé d'accorder à cette expédition le parrainage de la Fédération Française de Spéléologie.
*After study of the project, it has been decided to allow to this expedition the sponsorship of the French Federation of Caving.*

Pour valoir ce que de droit,
lundi 13 février 2023

Gaël KANEKO,
Président de la FFS

28 rue Delandine - 69002 Lyon – Tél. 04 72 56 09 63
Association loi 1901 reconnue d'utilité publique, agréée par les Ministères chargés des sports, de la jeunesse et de l'éducation populaire, de l'intérieur (agrément sécurité civile) et de l'environnement.

© Edition Explo-Laos 2023
www.explo-laos.com