The Sangki System (Sumatera Barat, Indonesia)

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Abstract

The Sangki system is developed in the impressive cone-karst of Gunung Seribu (Indonesia: Sumatera Barat). The underground Sangki river crosses the limestone range from northeast to southwest. From its sink, the river can be followed on about 6 km in large galleries interrupted by several boulder zones (Ngalau Surat, total development more than 6.5 km). The passage continues downstream, but retreat was decided because of Mulu Foot desease. The Sangki river resurges among a boulder choke which cannot be entered. However, a little higher in the massif, Ngalau Ikan Sangki gives another access to the river. This fine river cave, unfortunately littered with plastic bags left by swiftlet nest collectors, was followed 1 km downstream and about 3 km upstream. At this point, we were at a few hundred metres from the extreme downstream point of Ngalau Surat, but connection was not made by lack of time. Ngalau Sopan Kijang is a third, large fossil cave which joins the Sangki river 2 km from Ngalau Ikan Sangki entrance. At last, Ngalau Puangan Hilir, a stream sink several kilometres north of the Sangki resurgence, has been explored on 1.3 km to a choke. It probably corresponds to the large inlet which arrives a few hundred metres of the downstream terminus of Ngalau Surat. The four parts of the system develop altogether 12.3 km, and their connection would make it one of the largest subterranean system in Indonesia. The Sangki system is also interesting for its subterranean fauna, now the best known of Sumatra. Several troglobitic species and a few stygobitic ones have been discovered, as listed in this paper.

Introduction

A long range of permo-carboniferous limestone extends on 100 km ENE of Padang, from Payakumbuh basin to Sungaidareh, following the general direction NW-SW of the Sumatra island. The main massifs of this range are the two impressive cone karsts of Gunung Seribu (“thousand mountains”) and Gunung Ngalau (“mountain of the cave”), separated by the Batang Kuantan river. At the foot of the extinct volcano Gunung Malintang (2262 m), Gunung Seribu stretches 35 km long for up to 5 km wide. A multitude of peaks rise up to 650 m above the level of the Sinamar river which flows parallel to the massif from 350 to 200 m of altitude.

The caves

Gunung Ngalau is the place of the first large western speleological expedition in Southeast Asia: in 1977, a Catalan group explored the large underground river of Ngalau Lagung on more than 4 km (ULLASTRE-MARTORELL, 1978). The speleological exploration of Gunung Seribu began with an expedition of the Association Pyrénéenne de Spéléologie in 1993 (BEDOS *et al.*, 1994), followed by several visits of the same group in 1995 (DEHARVENG & BEDOS, 1996), 1996 (DEHARVENG *et al.*, 1998), 1998 (DEHARVENG *et al.,* 2000) and 2000 (DEHARVENG, 2000; PRICE, 2001). Three large caves and a smaller one were explored on the system (table 1).

The sinks of the rivers Sangki and Puangan Hilir were discovered in 1993 during a short reconnaissance trip. A one day walk from the small town of Lintaubuo through Tabatpadjang led us to the place where the Puangan Hilir stream enters the mountain. François Brouquisse equipped the shaft (-61 m) and explored 156 metres on the second day (BROUQUISSE *et al.,* 1995). Meanwhile, we pushed to the Sangki river sink. After a half-day jungle walk, we easily found the entrance and followed the stream on 1.9 km in a vast gallery, by place 50 m wide and 30 m high, meandering in a roughly northeast-southwest direction. We halted in small galleries after at a large chamber (“La Grande Salle”, about 200 m x 50 m) with obvious way on.

The 1995 and 1996 expeditions focused on Ngalau Surat. Just after the large chamber, the river flows in a relatively narrow passage; and suddenly switches to a SEE-NWW direction. The size of the passage rapidly increases afterwards, with galleries often similar to the first part of the cave, though a bit smaller (often 10 m large and 20 m high). The river was followed on four more kilometres without real obstacle other than five huge boulders. At about 1.5 km from the big chamber, the river flows at high speed for 120 metres in a narrow (2 m) and straight diaclase developed in a breccia polished by water (“The Breccia”). Half kilometre

later is the only waterfall of the Sangki river: + 2.5 metres. At more than 5.5 km from the entrance of Ngalau Surat, an inlet as large as the Sangki river itself arrives from the north at the level of a huge room partly filled with boulders. It was followed 150 m upstream to another huge boulder. This inlet might be the Puangan Hilir river, or, after local people, another river which sinks a few hundred metres from Puangan Hilir. Short after the inlet junction and the boulders, the main stream entirely occupies a low (about 1.3 m) and windy passage, which opens on a large meander beautifully decorated. As water level of the stream showed signs of rising, and severe foot pain was beginning to affect some of the cavers, we had to stop exploration. The trip back to the entrance lasted about 6 hours.

Table 1 - The caves ("ngalau") of the Sangki system (see bibliographical references for details)

	1993	1995	1996	1998	2000	total mapped	total explored
Surat	1749 m	2559 m	2216 m	0	0	6524 m	7000 m
Puangan Hilir	156 m	0	1138 m	0	0	1294 m	1500 m
Ikan Sangki / Sapan Kijang	0	0	0	2824 m	2141 m	4965 m	5200 m
Ngalau Batang Sangki	192 m	0	0	0	0	192 m	200 m

[Parts of the cave of Surat and Sangki have been re-mapped, accounting for the differences with values given in previous reports like DEHARVENG *et al.*, 2000)].

The exploration of Puangan Hilir was completed during the 1996 expedition. The maze of small tubes at the bottom of the entrance shaft leads to a vertical narrow passage, which gives access to a small inlet choked upstream after 100 m. Downstream, the main stream is rapidly reached. The gallery increases in size, becoming similar to those of Ngalau Surat. Two boulders slow the progression in the last 200 m explored. We stopped at a third boulder where continuation appeared to be more technical.

During the first three expeditions, we were repeatedly told of large caves near the Sangki spring. Visiting this resurgence in 1993, we only found a short fossil passage (Ngalau Batang Sangki) where we stopped at the head of a narrow 10-15 metres pitch without wind. The resurgence itself (1 to 2 m^3 per second after BROUQUISSE *et al.,* 1995) emerges from a large boulder and is not penetrable. It is only in 1998 that tongues loosened, and we were informed of two big caves near the Sangki spring. After long negotiations with the local police and Koramil (army), we got at the last moment a permit to enter Ngalau Ikan Sangki and Ngalau Sapan Kijang, the two major swallow nest caves of the area, located near the Sangki spring. In the remaining 3 days of the 1998 expedition, we mapped 2824 m of passages (of which 924 m were re-mapped in 2000), including 2148 metres of river, in large galleries, often 10-15 m in diameter. When we came back in 2000 however, the situation had completely changed. Armed militia of villagers replaced the army at the entrance of the cave. The situation was tense between the villagers and the companies which used to exploit the nests, and even between groups of nest harvesters from different villages. The traditionally sustainable exploitation of swallow nests, a huge local income (KAHAR, 2000), was only souvenir. Bands entered the cave day and night for harvesting, and the more visible environmental effect was that the river galleries were littered on kilometres with an incredible quantity of plastic bags, batteries and various abandoned instruments. Negotiations to enter the cave were also much harder. We got permit from traditional authorities (companies and police), but they were no more recognised by the militia. We were finally granted two underground trips. Sapan Kijang, a large fossil cave which is the main access to the Sangki underground river for nest harvesting, was mapped on 494 m to its junction with the Sangki river in Ngalau Ikan Sangki. In this last cave, 1.3 km of river led to a very large boulder which ended after 155 m in a very narrow and unstable passage. Beyond, 200 metres of large galleries were explored. At most a few hundred metres remain to link Ikan Sangki to Ngalau Surat.

The Fauna

Cave fauna of West Sumatra is among the best known in Indonesia (LECLERC *et al.*, in press), but that of Gunung Seribu was totally unknown. The biodiversity of the Sangki system caves is rather high, with a few highly troglomorphic species. Several of these taxa, new to science, are under description. The list given in

table 2 updates and complements the previous lists of BEDOS & DEHARVENG (1998) and DEHARVENG & BEDOS (1995, 2000).

Perspectives

The cumulative mapped length of the four caves of the system is 13 kilometres. Connecting Ikan Sangki and Surat would give a 10 km through trip along the subterranean Sangki river, and will be the main objective of the next expedition. On old Dutch maps of 1893, many other caves and stream sinks are spotted in the karst above the Sangki system. Do they connect to the main collector? Will they give access to fossil passages like Sapan Kijang? Our second objective will be to look at these numerous karst features. At least, a collaborative work is planned with Museum Zoologicum Bogoriense and Padang University, to explore the effect of karst fragmentation on subterranean endemism in the karsts of Western Sumatra.

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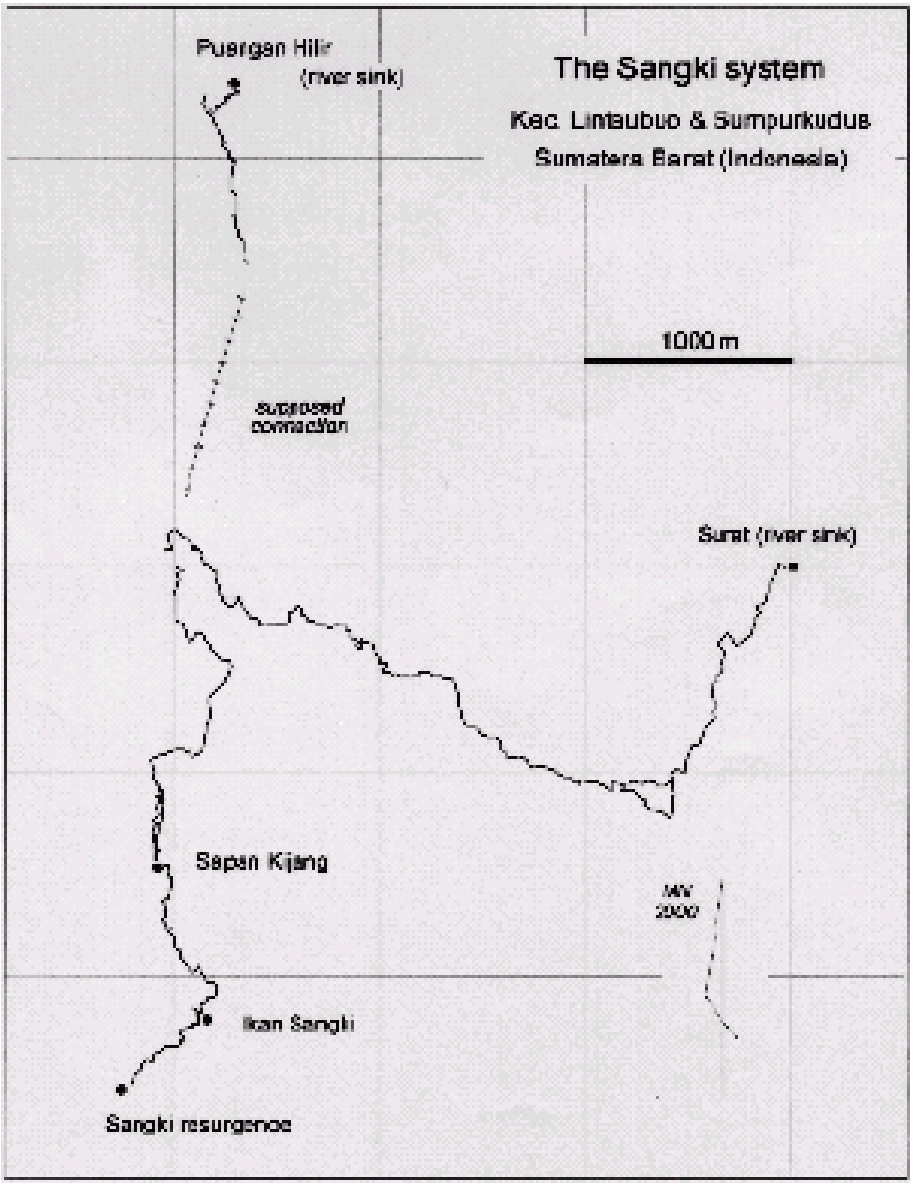

Table 2 - The fauna of the Sangki system caves. Only troglobites (T), stygobites (St), guanobites (G), wall fauna (P), important stygophiles (Stp) and important troglophiles (Tp) are listed. 1, Surat; 2, Puangan Hilir; 3, Ikan Sangki; 4, Batang Sangki. spp.: several species are present.

Plathyelminthes		
Tricladida sp.	St?	1
Annelida		
Hirudinea sp.	T,P	1
Mollusca		
Gastropoda spp.	G	1
Arachnida		
Acari: Gamasida spp.	G	1
Acari: Trombidiidae sp.	T	1
Acari: Uropodida spp.	G	1
Amblypygida: *Phrynichosarax* sp.	G	1
Araneae spp.	T	1,4
Araneae: *Heteropoda* sp.	G	1,3
Araneae: Pholcidae (?) sp.	G,P	1
Opilionida sp.	T	1,2
Pseudoscorpionida sp.	T	1
Schizomida sp.	G,T	1,3,4
Crustacea		
Amphipoda: Bogidiellidae sp.	St	1,3,4
Decapoda: *Malayapotamon brevimarginatum*	Stp	1
Isopoda: Armadillidae spp.	G,T	1,3,4
Isopoda: Philosciidae spp.	T,Tp	1
Isopoda: *Stenasellus* n.sp. nr *strinatii*	St	1
Isopoda: Trichoniscidae (?) sp.	T	1
Myriapoda		
Chilopoda: Geophilomorpha sp.	G	1
Chilopoda: Scutigeromorpha sp.	G,P	1,3
Diplopoda sp.	T	1,4
Diplopoda: Cambalopsidae sp.	G	1,4
Diplopoda: Glomeridesmidae sp.	T?	1
Collembola		
Acherontiella sp.	G	1
Coecobrya (?) sp.	G	4
Cyphoderopsis sp.1	T	1,3,4
Cyphoderopsis sp.2	G	1
Folsomina onychiurina	G	1
Oncopodura sp.	T	1
Pararrhopalites sp.	T	1
Insecta		
Blattodea sp.	G	3
Blattodea: Nocticolidae sp.	T	1,2,4
Coleoptera: Aderidae sp.	G	1
Coleoptera: *Ptomaphaginus* sp.	G	1,3,4
Coleoptera: Staphylinidae spp.	G	1
Diptera spp.	G	1
Diptera: Psychodidae spp.	G	1
Hemiptera: Emesinae sp.	G	1
Hymenoptera: *Anochetus subcoecus* (?)	?G	1
Hymenoptera: Formicidae sp.	G	1
Lepidoptera: Tineidae spp.	G	1
Orthoptera: *Rhaphidophora* sp.	G,P	1
Trichoptera: Trichoptera sp.	G?	1
Vertebrata		
Aves: Apodidae sp.	G,P	1,3
Mammalia: Chiroptera spp.	G,P	1
Pisces: *Puntius binotatus*	Stp	1
Reptilia: *Elaphe* sp.	G,P	1

References

BEDOS, A., BROUQUISSE, F. & L. DEHARVENG. 1994. Echos des profondeurs: Indonésie: reconnaissance à Sumatra. Spelunca, 53: 15-16.

BEDOS, A. & L. DEHARVENG. 1998. La faune souterraine de Ngalau Surat. In: (L. Deharveng, ed.): Expédition Sumatra 96. APS, Toulouse: 32-36.

BROUQUISSE, F., BEDOS, A. & L. DEHARVENG. 1995. 5-Résultats spéléologiques. In: (APS, ed.): Expédition Sumatra 93, rapport spéléologique et scientifique: 25-40.

DEHARVENG, L. 2000. Sumatra 2000 expedition. International Caver, 2000: 82-83.

DEHARVENG, L. & A. BEDOS. 1995. 6-La faune souterraine de Sumatra Barat. In: (APS, ed.): Expédition Sumatra 93, rapport spéléologique et scientifique: 41-44.

DEHARVENG, L. & A. BEDOS. 1996. Sumatra, nouvelles explorations au Gunung Seribu. Spelunca, 61: 5-6.

DEHARVENG, L. & A. BEDOS. 2000. The cave fauna of Southeast Asia: origin, evolution and ecology. In: (H. Wilkens, D.C. Culver, & W. Humphreys, eds.): Subterranean ecosystems. Elsevier, Oxford: 609-638.

DEHARVENG, L., BEDOS, A. & H. GIBERT. 2000. Catalogue des phénomènes karstiques de Sumatera Barat et Aceh. In: (L. Deharveng, ed.): Sumatra 98, rapport spéléologique. APS, Toulouse: 19-24.

DEHARVENG, L., BELUCHE, F., BEDOS, A. & M.A. BELUCHE-CANTO. 2000. Explorations 1998 dans les karsts de Sumatera Barat. In: (L. Deharveng, ed.): Sumatra 98, rapport spéléologique. APS, Toulouse: 28-41.

DEHARVENG, L., BELUCHE, F., BEDOS, A. & M.A. CANTO. 1998. Explorations et prospections. In: (L. Deharveng, ed.): Expédition Sumatra 96. APS, Toulouse: 20-31.

KAHAR, A. 2000. Grottes, salanganes et dollars. In: (L. Deharveng, ed.): Sumatra 98, rapport spéléologique. APS, Toulouse: 42-43.

LECLERC, P., DEHARVENG, L., JUBERTHIE, C., DECU, V. & P. NG. (in press). Indonésie. In: (C. Juberthie & V. Decu, eds.): Encyclopaedia Biospeologica.

PRICE, L. 2001. Sumatra 2000. Cerberus Spelaeological Society Journal: 15-22.

ULLASTRE-MARTORELL, J. 1978. 6. Reconnaissance morphologique et spéléologique aux régions karstiques de Sumatra Barat (Indonésie). Phénomènes karstiques III, Mémoires et documents du CNRS, : 85-100.