Czech Speleological Society

2013–2016

Content

Dear colleagues,

Czech speleology can boast one of the longest histories. Our predecessors started to study karst areas in Czech lands as early as four centuries ago. They were people of various professions and nationalities. All of them had one quality in common: a desire to discover the enigmatic underground world. The first pioneers, renowned scientists of their time, believed that the caves were inhabited by dragons, that they served as gateways to other worlds, or that they were hiding treasures. In fact, that there was a bit of truth about these romantic expectations: the caves really conceal riches such as, for example, water resources. With their endemic forms of life, the caves really represent other worlds, and some of the troglobites may really resemble supernatural monsters in their appearance.

Over the last forty years, the Czech Speleological Society is bringing together scientists, surveyors, divers, romantics and a boundless variety of other individuals who can vividly discuss their common problems for hours, who can live their austere lives side by side at expeditions, who can spend years digging in mud and sacrifice their whole lives to caves and karst.

In this modest volume, we wish to inform the readers of a small part of the activities of Czech cavers in the period of 2013–2016, both domestic and international.

More detailed reports of our members and Czech teams can be found on our webpage speleo.cz and in the Speleofórum proceedings, published by the Society on an annual basis.

Marek Audy
President of the Czech Speleological Society

Report on the Activity of the Czech Speleological Society in 2013–2016

Report on the Activities of the Board of the CSS

The Board was working in the following team:
Zdeněk Motyčka – President
Marek Audy – Vice-president, Barbora Šimečková – economist, Radim Brom, Tomáš Mokrý, Mojmír Záviška, Jaroslav Šanda (resigned in 2015), Filip Doležal (since 2015).

The Board was engaged in the organization of the 16th International Congress of Speleology, which was held in Brno on July 21–28, 2013. The Congress was attended by 1007 participants from 43 countries. The Board of the CSS arranged promotion of the Society at the Congress (publication of a traditional brochure on CSS activities, print of the English version of the book The Mysterious Underground, promotion stand, etc.).
The Board of the CSS held the annual meeting of Speleofórum at Sloup in the Moravian Karst. All the events were organizationally supported by Caving Club Tartaros. A printed Proceedings volume was published at the occasion of each event.
The Board of the CSS prepared a draft of the new Statutes and the Organization Code of the CSS. Their adjustments were necessitated by the amendment of the new Civil Code.

Principal international activities were pursued by the President of the CSS, who also functioned as a Member of the Bureau of the International Union of Speleology (UIS) from the year 2013. He took part in the ISCA Conference in Yenolan in 2014 and in the Karst School combined with the 50th Anniversary of UIS foundation in 2015. He also attended the Asian 2015 Transkarst speleological conference, the European Speleological Congress in Yorkshire Dales in England in 2016 and the American NSS Convention in Ely, Nevada in 2016. He also participated in the annual Slovak Speleomíting events and the annual Polish Speleokonfrontace meetings. As a UIS Bureau Member, he attended all three sessions held at the occasion of some of the above given events.

Editorial Board

The Editorial Board was working under the leadership of its Chairman Milan Geršl. It consisted of the following members: Tomáš Bohanes, Pavel Bosák, Jan Flek, Tomáš Mokrý, Jiřina Novotná, Petr Polák.

Four volumes of the Speleofórum proceedings were published (Volumes 2013, 2014, 2015, 2016), in addition to 11 issues of the Speleo journal (Nos. 60–70). The Editorial Board was constantly maintaining the operation of webpages of www.speleo.cz.

Reports of the organizational units

CSS Cave Rescue Service (CSS CRS)

The Cave Rescue Service of the Czech Speleological Society was working in this format: two centres named Bohemia and Moravia with the total rescue staff number of 30 (staff numbers 12 for Bohemia, 18 for Moravia). A team of rescue divers is also in a direct contact with the CSS CRS.

The CSS CRS is a member of the Integrated Rescue System of the Czech Republic. Regular annual training of SRT climbing teams of the Fire Rescue Service takes place but also a collaboration with other state-run institutions.

The CSS CRS concentrates not only on training of rescue teams but also on risk prevention among CSS members. As a part of a risk-prevention campaign, the individual centres organized "Climbing Day" events for a wide caving public. The CSS CRS collaborates with the Education Commission in the seminar "An Accident in a Cave".

A natural climbing simulator has been installed in the 13C Cave (Moravian Karst). It is used for the training of members of the CSS, CSS CRS and collaborating organizations of the Integrated Rescue System. Annual co-ordination drills of the whole CSS Cave Rescue Service were held on an annual basis.

In the period covered by this report, six serious accidents occurred in caves or other underground spaces in the Czech Republic:

June 8, 2013 Sinkhole 18, Harbešská Plošina Plateau, Moravian Karst, extrication of 1 person from a collapsed shaft.

September 25, 2013 Malá Amerika Quarry, Bohemian Karst, rescue of a person after a fall.

November 16, 2013 Kostelík Cave, Moravian Karst, extrication of 1 person.

January 23, 2016 Lipovecká ventarola Cave, Moravian Karst. Rescue of 1 injured person after a fall from a rope ladder.

March 5, 2016 Nový Lopač Cave, Moravian Karst. Transport of 1 person with no vital signs (cardiac collapse) from the cave to the surface.

November 26, 2016 Nový Lopač Cave, Moravian Karst. Transport of 4 persons from the cave to the surface after serious injuries due to a fall from a ladder.

The Pseudokarst Commission

Personal composition of the Commission was a subject to variation. At present, the Commission includes the following members: Jan Lenart, Josef Wagner, Jiří Kopecký, Oldřich Jenka, Jaroslav Kukla, Jaroslav Kukla Jr., Jiří Reil, Jiří Adamovič, Petr Jenč, Vladimír Peša, Jan Mertlík.

The main task guaranteed by the Commission was the preparation and organization of the 13th International Symposium on Pseudokarst, which was held at Kunčice pod Ondřejníkem in the Moravo-Silesian Beskydy Mts. on September 17–20, 2015. The task was managed in co-operation with the Ostrava University, UIS Pseudokarst Commission, Caving Club Orcus Bohumín and the Administration of the Beskydy PLA. The Symposium was attended by 52 specialists in non-karstic speleology from 9 countries.

The Cave Diving Commission

The Commission has been working in a new composition since 2015: Chairman Libor Čech and members David Čani, Michal Guba, Jiří Hovorka and Ivo Záruba. In the Czech Republic, there are many certified cave divers beyond the structures of the CSS who acquired their qualifications within various commercial training systems. Therefore, the Commission tries to inform these divers with the activities of the CSS, to offer them mutual cooperation and passing a re-qualification course under the CSS. The Commission plans to organize courses for the qualification "CSS Cave Diver" for CSS members.

The biggest event organized by the Commission in its present composition was the co-ordination drill with the CSS Cave Rescue Service, centre Moravia, in the 13C Cave, Moravian Karst, in September 2016.

The Speleotherapy Commission terminated its activities in 2015.

The Commission for Speleoalpinism and related activities (TK)

Chairman: Josef Wagner, members: Bohuslav Koutecký, Jiří Augustýnek, Pavel Tásler, Mojmír Záviška, Jakub Wagner, Jiří Antonín, Ondřej Belica.

The Commission creates and consults programmes for speleoalpinism and other activities at heights and over depths with the use of rope techniques. It takes part in organization and leadership of speleoalpinism courses, follows the development and legislative changes potentially related to speleoalpinism and other activities at heights and over depths, implementing the necessary legislative requirements within CSS activities.

The Commission collects information about gear used for climbing and speleoalpinism etc., and on technical standards related to this equipment. It applies knowledge of the use of techniques of sporting and professional climbing to educational programmes of the CSS.

The Commission collaborates with bodies whose activity is immediately linked with speleoalpinism and other activities at heights and over depths. At the same time it collaborates with foreign subjects dealing with similar agenda.

The Commission for Education

The Commission for Education of the CSS was established in the autumn 2014. It is involved mainly in the following agenda: educational programmes for CSS members, insurance of CSS instructors, seminars on single-entry accounting for societies and on the new Civil Code.

Local Caving Clubs of the CSS in 2013–2016

The Czech Speleological Society (CSS) comprises 63 Caving Clubs (CC) which altogether organize 1,100 members.

Caving Club Český kras

The Caving Club does not conduct research at any site of their own. Club members participated in several exploratory expeditions, excursions and supportive events in different caves of the Bohemian Karst (Na Javorce Cave, Martina Cave, etc.) and other sites in the Czech Republic, reconstructions of entrances to the Prosecká Cave and to the subterranean spaces at Braník.

Caving Club Tetín

The most intensive prolongation activities in the Bohemian Karst concentrated to caves in the Tetínská Gorge, especially to the caves of Turské maštale, Bišilu and Tetínská propástka No. 2. In the area of the Montánka Quarry, activities concentrated to the Devítikorunová Cave. Other works were performed in the Martina Cave and Plší Cave at Koda. The caves of Třívchodová, U buku, Turské Maštale and Bišilu were surveyed.

L. Falteisek participated in the organization of Subterranean Research conferences each year. The Club continued their traditional cooperation with many other clubs of the Czech Speleological Society, with the Bohemian Karst PLA Administration and the Cave Administration of the Czech Republic. Geophysical survey of the churches at Tetín and their surroundings was conducted.

Two Club members contributed to the study of various karst and mine areas in southern Israel and in the Begin Park in the Judean Mountains. In the Slovak Karst, the team cooperated with J. Stankovič and P. Kadlec in the Silická Ladnica Cave, the Ponor near Napajedla and the Krumpliš Ponor on the Silická Plateau. Club members joined exploratory and documentation works in the Loferer Schacht cave system and in the Kreuzhohle Abyss in Austria. They also continued the systematic research in the Temnica area near Nová Gorica in the Slovenian Karst, aimed at the identification of karst phenomena and artificial military caverns from World War I.

Caving Club Zlatý kůň

Activities of the Club were realized at the following sites:

Nová propast Cave – a closure reconstruction was completed in the cave.

Bonzákova sluj Cave – a free, inclined cavity over 10 m long with a lake was reached through a test pit in front of the ladder, after reaching the depth of ca. 7 m.

Petzoldovy Cave – activities in co-operation with the Caving Club Barrandien; a major obstacle to further possible prolongation is the collapse in the Manganový Dome, not challenged due to the high risk related to its mastering. Map documentation was taken by surveyors from both teams on a regular basis.

Caving Club Geospeleos

Activities of the Club were realized at the following sites:

Studniční Cave

Works continued in the lowermost part beneath the Kulivá chodba Corridor. The Pod Kulivou Corridor was prolonged by ca. 6 m. At its end, the ceiling trough started to rise, and washed granule started to come out. At this place, new spaces were reached: a chimney, a corridor and a dome (Horolezecký Dome) with a total length of ca. 20 m.

An advance by ca. 10 m was achieved in the Chodba zavaleného jeskyňáře Corridor.

A free continuation towards the NNE is expected behind the spaces between Stoupačka and the rear part of the Třech komínů Hall based on radiolocation tests. The cable line was extended and a few blocks were removed. The cave was prolonged by ca. 15.7 m by excavations. Its depth remains the same –30 m. The problem with CO_2 ventilation was solved in the lower part of the cave by replacing the existing tube by a larger-diameter one and extension of its end above the entrance, which induced a weak air flow.

Arnoldka Cave

Water level in the lake in the lower part of the Main course was permanently monitored. The highest level since the cave discovery was encountered in June 2013: the height of the water column was 38 m.

Air temperatures and CO_2 concentrations in the cave were measured quarterly at approximately 40 selected sites. Radon volume activity was measured in the Dračí tlama area of the Panoptical course. The results were evaluated and published in the Český kras journal.

Photographic documentation and a revision of a point field of traverses were conducted at specific sites. Virtual guided tours were photographed at appropriate places in the cave.

Čeřinka Cave – Palach Abyss

Air temperatures and CO_2 concentrations in the cave were measured quarterly at approximately 20 selected sites. Radon volume activity was measured in the Řícený Dome.

Water level in the lake in the lower part of the cave was monitored. Here, the highest level since the cave discovery was encountered in June 2013: the height of the water column was 29.8 m. The situation in June 2013 and the whole history of monitoring subsequently became the subject of a synoptic study published in Volume XXXIX of the Český kras journal.

Training dives were undertaken in the Podtrať ová Abyss.

Resurgence above the monastery at Sv. Jan pod Skalou

Deepening of the bottom of the test pit was continued, and water inflow was monitored. The depth of 9 m was achieved.

The sites managed by the Club were subjected to annual bat counting. Drawings were made of the wintering positions of all individuals, and a coloured schematic map was drawn thereafter.

The Club members are diligent in publishing, lecturing and organizing excursions in the Bohemian Karst region.

Several Club members are active in publishing scientific papers dealing with, e. g., karst hydrology of the Bohemian Karst and Moravian Karst. They collaborated with the Caving Club Hranický kras on the project called “Neuron Expedition – Hydrogeological investigations in the Hranice Abyss” and participated in the international research project “Aerosol and the formation of gypsum decorations under extreme conditions”.

Members of the Caving Club took part in the following expeditions abroad: Taurus 2016 international expedition in Turkey, in the Kota 1000 Speleoproject, Kanin, Slovenia, in the Kačna Jama 2015 expedition, Slovenia, photographic expedition to Svalbard, in the Iranian salt karst, in the Lamprechtsofen Cave in Austria, in Indonesia, India, Puerto Rico, Mexiko, Solomon Islands and in other regions.

Caving Club Speleologický klub Praha

The Club focuses its activities to caves in the Na Chlumu Quarry in the Bohemian Karst.
The collapse on the mid level of the Na Chlumu Quarry – The Old Collapse is a relict of an underground space ca. 10 by 5 m in size. The lowest known part of the collapse lies at a depth of 15 m. A new test pit, called The New Collapse, was started on the surface in the western part of the quarry. Its current depth is 13 m measured from the edge of the quarry bottom level. The excavations will be accompanied by a long-term paleontological research.
In the Netopýří Cave (Bat Cave), activities concentrated to the Vlčí vyhlídka (Wolf Viewpoint). The left branch of the Erik Dome revealed an ascending chimney and a 2 m long, steeply descending passage towards the SSE. A test pit (Bahnitá sonda) in the Connective Dome disclosed a low, 5 m long cavity elongated to the NNE, branching into two narrow passages extending towards 300°.
In early summer 2016, Club members participated in the research project of Prof. Horáček and opened a paleontological test pit near Cavity IV, about 4 m from the edge of the main level of the Na Chlumu Quarry. This resulted in the publication by Horáček et al. (2016).
Expeditions abroad
Members of the Club collaborate with the Drienka Speleoclub and with other cavers in the Slovak Karst. Together with the Caving Club Devon, they took part in the research of the Pestera de la Captare Cave in Romania, where 123 m of new spaces were discovered and surveyed. They also participated in the expedition to the Kačna jama Cave in Slovenia and in the expedition to Sardinia where they discovered and excavated the opening of an abyss with a potential depth of ca. 350 m. The discovery was named Martello Grande.
In cooperation with the Nyctalus Club and other organizations, the Club members regularly conduct bat counting in the caves and galleries of the Bohemian Karst.
The Club organizes the Chlumochod contest in technical climbing on Chlum Hill in the Bohemian Karst on an annual basis. It also runs educational events like the European Bat Night at Chlum and Open-Access Day in Caves at Chlum. The Club also contributes to the organization of the annual scientific conference of Subterranean Research, organization of a cave photography contest of Czech Speleo Photo, and runs and maintains a climbing simulator in the Na Chlumu Quarry.

Caving Club Krasová sekce

This club brings together cavers who deal with speleology within their profession to a certain extent, e. g., within their jobs at scientific institutions (National File of Speleological Objects database, updates of maps of show caves, contribution to the activities of the Cave Administration of the Czech Republic).

Caving Club Speleoklub Týnčany

Sites explored by the Club lie in the territory of the Týnčany Karst.
The Diviš Cave in the Týnčany Karst (central Bohemia) is developed in crystalline limestones of the Sedlčany–Krásná Hora Metamorphic Islet. In the year 2015, 17 m of free spaces were discovered there. This discovery followed an almost 10 years lasting removal of sediments from phreatic corridors of this cave by hydromining.
In the Májové Corridors, the Tartradómek Dome was discovered (the as yet largest space in the Májové Corridors) including several smaller adjacent passages. The Severní Chimney was prolonged by 10 m in total. In addition, a free continuation 7 × 7 × 2 m in size was discovered and called Čtyřicítka (Forty). A 10 m long continuation of the so-called Cukrárna (Confectioner's Shop) Hall was also found. The newly discovered spaces were surveyed and

their photographic and video documentation was taken. A year-round monitoring of water level fluctuation is conducted in the Diviš Cave.
The Club renders bat counting in the area of the Týnčany Karst and in the Krásná Hora historical ore district.
The Club provided pumping technology and evaluation of results of the pumping test in the Petzold Cave in the Bohemian Karst.

Caving Club Niphargus

Club members contributed to the exploration of caves in Slovakia and took part in the activities in the Hlbokô Resurgence and in the survey of the Brzotín Resurgence. Individual Club members practised other private caving and cave diving activities.

Caving Club Speleoaquanaut

Cave diving club
The year of 2014 was marked by a tragic car accident which brought about the death of Martin Honeš, one of the leading personalities of the Club.
The Club continued their activities at traditional sites in Slovakia, Sardinia, Mexico, Macedonia, Slovenia and Montenegro.
The Club organized public lectures, educational and training events. Club members are now shooting a series of short films on the present state of the Amerika Quarries, consisting of several parts. Shooting in the Únorová Abyss revealed the presence of tower cones (accumulations of sunken rafts). These specific formations have been previously reported, besides other sites, from the Hranice Abyss.
The Xibalba 2016 Expedition (Mexico) continued the activities in the so-called "Slovak" cenotes lying 3 km straight line from the K´oox Baal System. Club members focused on three cave entrances: Look Hol, Nah Baak and the newly discovered Mariposa. The hitherto known spaces were extended by the divers by 5 km of new corridors within 9 days. The "dry" team discovered six new cenotes in the jungle and surveyed ca. 200 m of dry corridors.
The joint Czech–Slovak Sardinia 2016 Expeditions. Two expeditions to Sardinia were realized in 2016. The one which took place in June localized more precisely the interconnection of Su Molente and Bue Marino Caves. The ultimate interconnection was reached by Italian divers only a few metres from the site where Dan Hutňan and Míra Manhart emerged during their diving in the Su Molente Cave.
Members of the Speleoaquanaut, Speleodiver and Čachtice clubs worked on the prolongation of the Bue Marino Cave System. Their effort resulted in the discovery of 500 m of new spaces in the Ramo Nord part at the most distant place of the cave! Behind Sump 20 in the Ramo Nord, they advanced 55 m above the sump level. The whole chimney, ca. 4 m in diameter, could not be climbed yet. Important is the progress of interconnecting the dry Buko Cave with the gigantic tunnel of Bue Marino behind the Hasenmayer Sump. This expedition thus created precondition for further exploration of the Su Palu – Su Spiria – Su Molente – Bue Marino system, which already became the longest cave system in Italy with its length of 70 km!

Caving Club Barrandien

Sites managed by the Club in the Bohemian Karst:
In the Na Javorce Cave, prolongation activities are continued in different parts of the cave. Free spaces 35 m long were discovered in a passage leading from the bottom of the Dvě tlamy Abyss.

A branch line from the main course of the cave was found. A fist-sized opening in the rock was widened, which permitted to enter free spaces – the corridor called Lochneska (Loch Ness Monster.) After excavation works, the corridor reached the length of 74 m at the end of 2016. The overall length of the cave is now 1,832 m, and the deepest place of the cave is the bottom of the Žbluňk Abyss (–129 m). Cryogenic calcite plates – so-called rafts – formed by precipitation at water freezing were found on the walls of the new corridor. According to the latest theories, they represent a relict of the Last Glacial in the Quaternary. In the Na Javorce Cave, they were found at several locations, mostly in the small abyss beneath the Půda part of the cave.

In the Jeskyně Nad Kačákem Cave, exploration of new spaces is under way. Exploratory works were focused on the Atlas Dome. In its terminal point, a narrow joint-controlled passage completely filled with clay-dominated sediments was excavated. The length of the excavated passage reached 15 m, and the first sediment-free space was found: a chimney 4 m high, called the Pink Chimney. Prolongation activities are currently continued especially in a passage extending from the Sněmovní Dome; excavations reached the length of ca. 16 m. A cable line for the transportation of excavated material was installed here.

The Petzold Quarry lies on the left bank of the Berounka River, between the towns of Srbsko and Karlštejn. The locality of the Petzold Cave is subject to joint cooperation between the Caving Club Zlatý kůň and Caving Club Barrandien. As a result of the exploratory works, individual small caves located in the Petzold Quarry were interconnected into the system of the Petzold Cave. The total length of the corridors is 830 m, altitude difference is 34 m, and the cave system has now 17 entrances.

In February 2013, a pumping test was undertaken in the Petzold Cave. It revealed a limited flow capacity in the cave system hence a limited possibility of cave continuation to other, as yet unknown spaces under the water level (Brom R., Vysoká H. 2014). The Club proceeded the long-term exploration of the plateau of Dolný vrch – Alsó-hegy (Slovakia – Hungary). Sedimentary fill was removed from the Nora-lyuk Abyss, reaching the depth of 20 m. A window, as yet impassable, leading to a free shaft was discovered. Maps, descriptions and GPS coordinates of other abysses were specified in more detail within the preparation of a book on karst features of the Plateau. Exploration of the Evés Abyss continued.

Caving Club Chýnovská jeskyně

A large part of the Caving Club activity is permanently focused on cooperation with the Chýnov Cave Administration in research, exploration and documentation of the Chýnov Cave. Positioning and a detailed documentation of limestone quarries and karst objects was still continued in the Chýnov Karst. Also, exploration of the Velmovice II Cave continued.

The Club takes part in the study of bats in the Chýnov Cave, in the monitoring of hibernating bats at other sites in the area and in bird ringing in poorly accessible nests using single rope technique.

The Club is involved in the exploration and documentation of historical underground spaces in the ore districts of Ratibořské hory and Stará Vožice. In the area of Kladrubská hora Hill, exploratory works were started around the transportation tunnel in an old quarry. This locality is considered a significant wintering site of bats, especially from the viewpoint of their wide species diversity.

Underground spaces of the church of Our Lady at Sušice, the church at Bohdaneč near Kutná Hora and the church at Dobruška were studied in collaboration with the “Our History” citizen association.

The Club contributes to the securing of the Na Vápenném vrchu Cave at Černá v Pošumaví.

Caving Club Šumava

Club members took part in the activities of Caving Club Aragonit in the Temné Skály Cave and in several events organized by Caving Club Týnčany aimed at hydromining in the Diviš Cave in the Týnčany Karst.

In collaboration with the Cave Administration of the Czech Republic and Caving Club Chýnovská jeskyně, the entrance shaft – partly covered with talus – into the Na Vápenném vrchu II Cave (Lipno Reservoir) was restored.

Club members visited historical underground spaces under the square at Týn nad Vltavou and, within the agreement with staff of the Muzeum at Týn nad Vltavou and the consent by the municipal office at Týn nad Vltavou, conducted exploration and geodetic survey of historical cellars at the former castle.

Caving Club Macarát

The Club regularly inspects historical sites around Hartmanice in the Šumava Mountains (Peklo Cave, Těšov old mine working, Jírovic jáma Na zámku old mine working) and renders their maintenance. Diving exploration of the Těšov mine working was conducted in December 2014. One of the Club members joined the Orca Diving Praha group in a cave diving expedition to Mexico (Yucatan Peninsula) aimed at the study of flooded karst (cenotes).

Caving Club Jeskyňáři Plzeň

Together with the ČESON, members of the Club participated in bat monitoring in West Bohemia. They also collaborated with the Association of Friends of St. Mauritius Mine at Hřebečná in historical-mining exploration of the Krušné hory region, contributed to the exploration and survey of the Mesačný tieň Cave in the High Tatra Mountains (Slovakia), participated in the exploration of the Kačna Jama cave system (Slovenia), in the exploration of the Hirlatzhöhle Cave (Austria) in collaboration with a local club, and in paleontological studies in the Nýřany area in collaboration with the West Bohemian Museum.

Caving Club Šumavský kras

The Club members contributed to the exploration of the Kačna Jama Cave, Divašski Karst, Slovenia, in 2014. They also took part in the organization of the annual Speleogames event at Nevřeň and in the organization of the Climbing Day in Plzeň.

Caving Club Permoníci

Exploration of the Dyleň Cave in the Dyleň Karst was re-started in 2014. Excavations in the middle part of the main corridor were continued, and a cable line was constructed beneath the cave ceiling for an easier transport of excavated material. The overall length of the cave is 20 m as of 2016.

Permoníků Cave

Excavation works continued along the northern wall of this abyss-like cave. The excavations reached a side niche free of sediment fill. The excavated part of the cave thus reached a length of 8 m.

Kmotrovo propadání Site

In 2014, a tracer test was conducted on the Zelený potok Stream by M. Marek with the aim to localize resurgences of karst waters from the Kmotrovo propadání Ponor. Conductivity values of spring waters were monitored at selected sites for three days; however, no significant conductivity changes were proved at any of the springs, and the resurgence was not found. Another tracer test was undertaken in collaboration with J. Bruthans (Caving Club Geospeleos)

in 2015. Neither the conductivity measurement nor the chemical analyses of water proved the presence of the tracer in water. The site of the issues of karst waters from the Kmotrovo propadání Ponor thus remains enigmatic.
The Club members actively proceeded in the documentation of caves in a karst area in Germany in collaboration with the local cavers (Bavaria). The Club member Dmitry Albov completed the exploration and survey of a new cave in Croatia. Besides, he conducts exploration and survey of historical underground spaces around Moscow and on the Crimean Peninsula, and makes chemical analyses of rocks for the Lomonosov State University in Moscow.

Caving Club Liberec

The Caving Club explores caves of the Ještěd Karst and the Jizerské hory Mts., regulerly monitoring bat numbers in the caves of the Ještěd Ridge, the Bohemian Paradise and partly also the Česká Lípa area. It is involved in the study of pseudokarst phenomena in granites of the Jizerské hory Mts. and sandstone caves of the Bohemian Paradise and Lužické hory Mts. The Club members also conduct climate monitoring in ice caves in the Lužické hory Mts. and Bezděz Hill.
A long-term investigation of the Hanychov Cave is under way. In the Western Cave, removal of a collapse in the Ponorový Dome continued. The Dvoustovka Cave was found in the summit part of the central segment of the Ještědsko-Kozákovský hřbet Ridge. At the depth of about 10 m, domes A and B were discovered by joint widening and excavation. These domes are developed along transverse joints. The cave has now a length of over 70 m. Prolongation activities were conducted in the Mramorová Cave (length of 30 m was reached) and Hliněná Cave on Vápenný vrch Hill near Raspenava.
The Club proceeds in mining-historical exploration of silver ore districts of Andělská Hora and Panenská Hůrka. Survey of an old mine working at Dolní Suchá was finished. The Club is making progress in drawing historical, mining and geological maps of the areas of Hrádek nad Nisou, Liberec and Jáchymov. The Club members are preparing a publication on modern mining in Rosia Montana in Rumania, which will summarize their long-lasting activities in this area. They also participated in the expeditions to Maganik in Montenegro and to the Iron Deep Abyss, organized by Caving Club Suchý žleb.
Every year, the Club organizes the Speleological Day event in the Panský Quarry and in the entrance to the Hanychov Cave, and the Klokočky Workshop aimed at the sandstone phenomenon. In 2013, the Club organized the Cavers Meeting under Ještěd Hill, which also included a conference with the theme "Compromising between cave protection and cave exploration" and a photo contest " Czech Speleo Photo 2013".
The Club benefits from a long-lasting collaboration with a number of various organizations in the Czech Republic. Traditional is the co-operation with Polish colleagues from the Wroclawska grupa Chiropterologiczna in winter bat counting in caves of Polom Hill and in the cathedral at Świdnica.

Caving Club Labské pískovce

This Club is engaged in discoveries, exploration and survey of pseudokarst caves in the region of Bohemian-Saxonian Switzerland. Its activities include bat counting at selected sites. The Club actively collaborates with staff of the Elbe Sandstones PLA and the Bohemian Switzerland NP. The Club members locate, explore and document old mine workings (e. g., in the Krušné hory Mts.) and historical underground objects in the whole Czech Republic, taking an active part in extensive lecturing and publication activities. The team collaborates with Saxonian speleologists and contributes to the specification of a database of caves on both sides of the state border.

Members of the Club were searching for entrances to the WW II underground production facility called "Bergkristall" in Austria (Sankt Georgen an der Gusen) and for entrances to underground objects of the Hitler's seat at Berchtesgaden – Obersalzberg.

Caving Club Goethe

The organization was established in 2013. It deals with exploration, survey, discoveries and re-opening of old mine workings in the Krušné hory Mts. (mining of gold, silver, fluorite, coal etc.).

The Club managed to open the Medieval Lehnschafter Mine (Mikulov, Krušné hory Mts.) to the public. The Club was active in the Mikuláš Mine at Hora Sv. Kateřiny and opened the mine to the public in 2013. Here, the visitors can experience silver and copper mining, which was practised here from the 14th century to the end of the 19th century.

Caving Club Bozkov

The Club is active at sites in the Bozkov area. The Modrý Dome was discovered after lowering of an abyss bottom in the Na Poušti Cave. The dome can be passed through into new spaces ca. 2 × 1 m in size. The cave is 38 m deep. Prolongation works are continued at the sites of Bozkovské Dolomitic Caves, Pod Větrnou Abyss, Na Vošmendě Cave and Ponikelská Cave.

A ponor was discovered on the Dolský potok Stream near Poniklá in 2014. After the removal of sediments and limestone blocks, the Club members managed to penetrate into a sloping passage and two interconnected domes at a depth of 12 m. The total length of the polygon of this newly discovered cave is 40 m, its depth is 27 m.

In cooperation with the Bozkovské Dolomitic Caves Administration, the Club annually organizes study trips to karst areas and historical underground spaces in the Czech Republic and abroad.

In co-operation with cavers of the Georgian Speleological Club, the Club organized a Racha 2016 Expedition to the Imereti and Racha area in western Georgia. During this event, surface exploration was conducted in the karstic Racha massif, and the caves of Muradi, Racha 2001, Tskhradzhvari III and a part of the Melouri Cave were surveyed. Corridors totalling 5,527 m in length were documented in these caves.

The Club organizes lectures and cultural events for the public. In 2016, it was the "Krakonošovo 2016" Meeting of Cavers. The Club also gives a Cavers' Ball on an annual basis.

Caving Club Albeřice

The Club explores caves, mine workings and geological sites in the Krkonoše Mountains. It deals with the exploration and documentation of historical underground spaces throughout the Czech Republic. It renders winter bat census at these sites. The Club members published many reports within their scientific activities.

The Club opened the Kovárna Mine in the Obří důl Valley for the public, renders its regular maintenance and access for tourists. Activities are conducted to make another part of the mine accessible – the Prokop Gallery in the Mezzanine.

Air temperature and water level were regularly measured in the Albeřická Cave. A recording device was installed above the Velká mramorová Abyss to monitor water levels and air temperatures at three sites.

Long-term excavations are under way in the Medvědí Cave.

Studies "Research of the Celní Cave at Horní Albeřice with special reference to the protection of karst phenomena" and "Documentation of carbonate bodies and associated phenomena (including anthropogenic) in the Albeřický and Lysečinský streams basins" were carried out for the Administration of the Krkonoše National Park.

In 2015, the Club organized an expedition to the Bohemia Cave in New Zealand. It served for the completion of map documentation, photographic documentation of the dome, survey along two geological sections, and acquisition of several geological and mineralogical samples.

Caving Club Broumovsko

The Club practises research, registration and documentation of pseudokarst phenomena in the Broumov area. Geomonitoring – regular monitoring at all 8 TM-71 gauges – is performed once a month in the terrains at Ostaš Hill, Kočičí Cliffs and Hejda Hill. The photos are sent to the Institute of Rock Structure and Mechanics CAS for the evaluation of results. The Club members check and document glaciation in the Teplická Cave and in the Pod Luciferem Cave, provide photographic documentation of spaces and root structures in the Plutonův chrám Cave.

The Club members show extensive publication and promotion activities and participate in study events and study trips in pseudokarst terrains in the Czech Republic and abroad.

The Club collaborates with many domestic and international organizations and partners dealing with pseudokarst issues, such as the Cave Administration of the Czech Republic, Administration of the Broumovsko PLA, Institute of Rock Structure and Mechanics CAS in Prague, Institute of Geology CAS in Prague, Instytut Ochrony Przyrody PAN, Kraków, Poland, and the Administration of the Góry Stolowe NP at Kudowa Zdroj.

The Club maintains active communication with the Pseudokarst Commission of the UIS. J. Kopecký Sen. participates in the preparation of the bulletin of the UIS Pseudokarst Commission "Newsletter – Nachrichtenbrief".

Caving Club Trias

The Club members work at the sites of Vápenný Podol (Podolská Cave and Páterova Cave) and Železné hory Mts.

They collaborate with the staff of the Administration of the Železné hory Mts. PLA in the study of bat fauna. Monitoring is provided at historical mining sites in Kutná Hora: collapses P1 and P2, Turkaňk Mine, and the 14 Pomocníků Gallery at Kaňk.

Members of the Club installed fixed safety ropes at sites with high risk of falling to free or flooded depth in corridors beyond the show trail in the Museum Mine in Kutná Hora.

Exploration is continued at the historical mining site of Studánka in the Bylanka Stream basin, where an advance of over 40 m was made. Exploration concentrates to the left branch: corridors are prolonged and critical profiles are cleared. A map of the mine is regularly updated.

The Club collaborates with the Graphite Mine in Český Krumlov, with the Institute of Archaeology CAS and other institutions.

Caving Club Antroherpon

Biospeleological research was carried out in the Czech Republic and abroad (caves of the Czech Republic, Slovenia, Montenegro, Serbia, Slovakia, Hungary and Albania).

Monitoring of the distribution of microscopic fungi in Czech caves is continued in collaboration with the Institute of Soil Biology in České Budějovice. The obtained results show that the caves are abundantly colonized by microscopic fungi; many species are associated with specific substrates while some other species occur on various substrates.

The Club members still concentrate on the prospection for root structures and their documentation. A synoptic database of these structures is being constantly supplemented.

Wintering bats are monitored in selected caves of the Bohemian Paradise and the Svitavy area in collaboration with the Czech Bat Conservation Society (ČESON).

Caving Club Býčí skála

Activities of the Club concentrate to the Býčí skála Cave in the Moravian Karst. Various parts of the cave were explored (Šenkův Sump, Svozilova Cave, Passage of Adamov Cavers, Fialová Passage, Kokosová Passage). During the check-out and installation of safety elements to the Nad plachtou Chimney, a horizontal passage was discovered (Kočárová Passage) ca. 110 m in length. Besides, other free spaces were discovered (Labilní Chimney).

In the area of the Hlinité Halls, activities were centred around the dominant tectonic structure in the continuation of the axis Hlinité Halls – Passage of Adamov Cavers. The Club members managed to find a corridor at the height of ca. 50 m above the level of the active flow of the Jedovnický potok Stream. It was named Fialová Passage and is ca. 30 m long, max. 6 m wide and 4 m high.

In the course of 2015, the inflow sump in the Fialová Passage was penetrated and a free space ca. 15 × 4 m in size was discovered. It was given the name Velkopáteční Dome (Good Friday Dome). After the collapse of the Velkopáteční Dome and its fall into the access corridor, a free continuation into other spaces was found in this dome. These spaces were given the name Nová Fialová Passage.

Before the autumn 2016, more than 10,000 bones and bone fragments of Pleistocene animals were recovered from the Barová Cave within a research project. These finds are being gradually processed in the laboratories of the Anthropos Institute of the Moravian Museum. The finds and their interpretation were covered in many scientific and popular publications. The team members conducted paleontological research also in the Pružinská dúpna Cave in the Strážovské vrchy Mts. in Slovakia in collaboration with colleagues from the Caving Club Strážov of the Slovak Speleological Society.

The Club members participated in the expedition to the Kačna jama Cave in Slovenia and the Shaanxi 2016 Expedition to China.

The Club organizes Open Days for the public in the Býčí skála Cave on an annual basis.

Caving Club Vratíkovský kras

An unregistered, 8 m long cave was discovered by the Club members in the right-handed slope of the Josefovské údolí Valley (Slovenská stráň). It was named the Nad Vzteklínem Cave and surveyed.

A regular spring-time cleanup of garbage took place in the Vratíkov Karst.

The Club members regularly take part in expeditions to Temnice, Slovenia. They are involved in long-lasting survey of caves and caverns from WW I.

Caving Club Rudice

Tumperk Abyss: excavations were continued in a road collapse at Rudice, where a depth of 40 m was reached. The collapse is probably located in the uppermost portions of the Chimney in the Rudický Dome in the Rudické propadání Cave. Measurements using a radiolocation unit and a georadar were taken.

Regular revisions and repairs of rope crossings were made in the Rudické propadání Cave. Based on an agreement with the Administration of the Moravian Karst PLA, the ponor was cleaned from deposited wood fragments.

The Club members took part in expeditions to the Andy's Cave in Austria, in the Temnice area in Slovenia, and in the Shaanxi 2016 Expedition to China.

The Club members were helping with the organization of the 16th International Congress of Speleology in Brno in 2013 and with the pre- and post-congress excursions. As a post-congress event, a Rescue Camp – ASV (first aid in caves) was held under the participation of the FFS SSF.

Caving Club Křtinské údolí

The Club is active in the Křtinské údolí Valley in the Moravian Karst. The entrance corridor in the Bezejmenná Cave is being widened, with the attained length of 8.5 m. In the Nová Drátenická Cave, the Club members managed to pass through a sump about 30 m upstream. Here, three chimneys and another sump were discovered. The third chimney passes into a horizontal space with wonderful decorations. The Prasečí Chimney was prolonged by ca. 40 m upwards, and the U strážce Hall was reached.

Activities in the Výpustek Cave – Salmův Výpustek continued with the aim of reaching lower levels and free spaces (attempts to find the Urbánkův Výpustek). The downward advance was 7 m per year, and another 5–7 metres must be excavated to reach the theoretical lower level. The Third abyss was deepened – 12 m^3 of material were extracted.

In the Mariánská Cave, maintenance of the entrance was performed and water levels were monitored. During attempts to connect this cave with the Čertova díra Sinkhole, a narrow, 15 m long passage with dripstone decorations was discovered at the mid level.

A regular bat census was conducted at the individual sites.

Caving Club Vilémovická

Exploration of unknown spaces behind the sump continued in the Vilémovické propadání Cave. Timber support was repaired in the entrance shaft. At the site of Daňkův žlíbek Cave, exploration was conducted in the "Velký Dome" and ladders were repaired in the big abyss. The Kajetánův Sinkhole was equipped with fixed ladders. The entrance corridor in the Cihelna Sinkhole was deepened and widened.

Caving Club Tišnovský kras

A hall 10 × 6 m in size and 6 m in height was discovered in the Průvanová Cave in the Lažánky–Heroltice Karst in 2016. In the Králova Cave, works at the end of the Naděje Gallery were continued. A new survey of all underground spaces was finished using the new DISTO laser range-meter. Excavations continued in a test pit in the Tišnovský Dome; the pit reached a length of 25 m.

The Club organizes Open Day events in the Králova Cave every year.

Other achievements: revision and digitization of a map of the small Řícená Cave, installation of new anchoring points in the Květnická Abyss, regular bat census at various sites, a working event in the Duča Cave in Slovakia, reconstruction of the memorial cross on Květnice Hill.

Caving Club Dagmar

In the Cave No. 567 Dagmar, works continued on the bottom of Abyss II and along the connection line between Abysses II and II. In the Pod Kaplí Abyss, the Club members succeeded to penetrate into a small hall with obvious continuation. A narrow pass, leading almost vertically downwards, was opened in the bottom of the abyss and reached a steeply sloping floor covered with flowstone cascades. Then, it was possible to penetrate into a short, almost horizontal continuation.

Parameters of discharging waters during spring thaw were monitored in the V Jedlích Ponor. The activities included extraction of loam-dominated material caved in after floods and removal of decayed timbering. Termination of the Meandrový Dome was surveyed with the use of a radiolocation device.

Opening of the Mlhův Sinkhole continued. Its surroundings were measured by a georadar in collaboration with the Faculty of Science of the Palacký University in Olomouc.

The Club members were also assisting in research activities of other caving clubs and showed

extensive activities abroad, especially in Slovakia. In the Tisovec Karst, the Moravská Cave was discovered and prolonged, reaching a length of 100 m. The Club members also participated in expeditions to the karst area around Poreč on the Istria Peninsula in Croatia.

Caving Club Labyrint

A cave diving organization. Exploration of chimneys took place in the Červíkovy Caves in the Macocha Abyss, Moravian Karst. The chimneys are accessible for cave divers only, and a distance of 77 m from the point of plunge was reached. Dry parts of the cave were studied after the necessary transport of material; no continuation has been, however, found yet.
In the Malý výtok Cave, the state of the site was checked and preparations were made for a replacement of the guiding rope.
As a part of foreign activities of the team, a training trip of the divers to the Dordogne and Lot area was undertaken. The Club members participated in a joint expedition of the Czech Speleological Society, Institute of Karst Geology of the Chinese Academy of Sciences and the Geological Institute from Xian in the Shaanxi Province, China.

Caving Club Hluboký závrt

The principal site of the Club is the Kombajnérka Sinkhole. Working activities in the sinkhole are complicated by insufficient air circulation; this necessitated supply of fresh air to the bottom. Here, a cave-in was safeguarded against further mass movement.
The team also organized inspections and excursions to other sites maintained by the Club, but also excursions to other sites in the Moravian Karst.

Caving Club Královopolská

Hydrological studies were continued in the Ochozská Cave. In particular, hydrology of drip waters was studied with the use of two automated measurement stations, automated drip-water sampler, chemical analyses of these waters as well as manned measurements and drip-water sampling. The origin of horizontal water flow was investigated in the Zkamenělé řeky Corridor in the Ochozská Cave. This flow was particularly strong in 2010. Digging of a test pit was continued to the present depth of 3 m, and geological documentation of the sediments was made.
Headward erosion is subjected to long-term monitoring in the upper part of the karst gorge of Jamina draga and in the area of the Fruga Polje in the Lopar Karst on the Rab Island.
The Club members were very active in the publication and presentation of the achieved results.

Caving Club Speleologický klub Brno

The main activities of the Club concentrated to the Řičánkova skála Cliff near the Hostěnické propadání Ponor. At the depth of ca. 12 m, after widening of a narrow, the Club members managed to penetrate into a sediment-free hall with intensive draught.
A new, as yet unknown ventarola was found in the foreland of the portal of the Kůlnička Cave in the Údolí Říčky Nature Reserve. After ventarola cleaning, a sediment-free vertical abyss occurred with a promising horizontal continuation directed beneath the system of the known cave.
Exploration was conducted in the area behind the collapse of the Pekárna Cave using a radiolocation device and a georadar.
The Walihloch Gallery in the Malínská rokle Gorge near Šumperk was documented. The gallery is about 10 m long and probably represents a modern-time prospection adit.
Members of the Club contributed to the work at sites maintained by other teams in the Moravian Karst, most notably in the research of the Býčí skála Cave and in the Ochozská and Nová

Drátenická caves. In Slovakia, they studied the Javorinka Cave in the High Tatra Mts. Excursion visits were paid to the Kungur Cave in the Urals, to the karst of the Franconian Jura Mts. in Germany and the underground city of Osowka in Poland.
The Club members were very active in the publication and presentation of the achieved results.

Caving Club Jihomoravský kras

Several events and survey campaigns were undertaken in the Na Turoldu Cave: in the upper cave levels, in the "U Vojtova výšvihu" area and in the "U Kobry" area.
Several working events were realized in the talus-filled part of the Pod vrcholem (Blechatka) Cave. New spaces were discovered ca. 10 m in length.
Several exploratory events were undertaken in the caves of the Pavlovské vrchy Mts., during which two new caves were discovered.
The Club members were also dealing with the exploration of historical underground spaces at Hostěradice: ca. 1 km of corridors were discovered.
The Club members contributed to the activities of other teams, especially in the Moravian Karst. They participated in the expeditions to Bulgaria, Romania, Montenegro, Austria, Slovenia and Kosovo.

Caving Club Suchý žleb

The Club members were mostly working in Sinkhole No. 1 on the Harbechy Plain. Here, a shaft has been driven to the present depth of 40 metres. Further advance is clearly connected with strong draught.
In Sinkhole No. 3, excursions were made behind the terminal sump at a depth of 90 m. They were connected with survey and discussion of further progress, which will be, however, very difficult.
In the system of the Svážná studna Cave, activities concentrated to a branch of the Piková Corridor.
In the Kravská díra Cave, a narrow draught shaft was reached. It may be interconnected with the Vilémovické vody Stream.
Traditional expeditions to the Maganik and Dragalj regions were undertaken within international activities of the Club.

Caving Club Holštejnská

The principal research site of the Club is still the Černý Sinkhole, where the Černý Chimney was progressively climbed and its support was constructed. In the upper part, it bifurcates into two other chimneys. The study of the chimneys will be continued. Other activities included widening of a narrow, complex and sloping meander. The overall length of the meandering corridor from the lowermost point of the shaft was thus extended to ca. 76 m.
In the Holštejnská Cave, excavation of test pits was carried out in side passages and in the terminal part of the Main Corridor.
The entrance to the Lipovecká ventarola Cave was re-opened. From the Meandrový Dome area, the team penetrated through a cave-in to the ceiling of a huge, dome-like corridor ca. 35 m long, 5–6 m wide and 6–8 m high, with beautiful decorations. This space was named Netopýří Dome (Bat Dome). Behind this dome, the team managed to penetrate into other spaces in several steps.
The Club members participated in the expeditions to the Notrjan Karst in Slovenia and to the Slovak Karst.

Caving Club Tartaros

Hydromining continued in the Starý Lopač Cave in the direction towards the Mlynářovo Ponor. Joint-controlled passages ca. 20 m in length were cleaned in the Pyžamová Corridor.
In the Nový Lopač Cave, hydromining was conducted in the lower corridor next to the sump. A hydrogeological experiment applying a hydraulic pulse was performed in co-operation with J. Bruthans of Charles University, showing that the real length of the unknown channel with flowing water and a free ceiling is about 3,800 m!! In the Kalciťák area, the team managed to penetrate into a vertical joint through which a space with water level communicating with the sump was reached by hydromining. As evidenced by cave-diving survey and subsequent pumping tests, communication exists between the outflow sump and the newly discovered water level. From the Hladinka area, the team penetrated into a new dome around 15 m high, with a huge collapse in the front wall.
Removal of sediment and talus from the abyss bottom was realized in the Karhanův Sinkhole. A depth of 60 m was reached to this date.
Opening works were realized in the Studená Cave: the team managed to reach to a distance of 30 m.
Survey in the Moravian Karst continued with the aim to create a 3-D model and new detailed maps in electronic format. Also, measurements were taken using a powerful georadar of the RTG company. The Club members contributed to the reconstruction of the Shaft beyond the Evropa and Indie Cliffs. They also did their traditional work in the Krásnohorská Cave in the Slovak Karst. Corridors ca. 60 m in length were discovered in the Silická Ľadnica Cave. During their joint activity with the Tisovec team in the Suché doly Nature Reserve, continuation of the system of the Daxner Cave was discovered about 200 m in length and 50 m in depth.
The Club members were very active in the publication and presentation of the achieved results.

Caving Club Topas

Prolongation activities were continued in the Cave No. 54B Kamenný ponor, in the Cave No. 75A Horní Suchdolský ponor, and in the Cave No. 173 where the length of 76 m was achieved. In the Cave No. 45 U čtyř vchodů, a successful pass was made through the narrows to the Trezorka Corridor.
Research and documentation works in the Nová Amatérská Cave were performed at several sites. The Komín nad Balvanem Chimney near the Nulté Lake was climbed: its height is 25 m.
In 2016, pumping of the terminal sump was realized in the Cave No. 438 Štajgrovka. Sediments about 2 m^3 in volume were removed by hydromining, exposing the sump bend in a profile sufficient to pass through. Behind the sump, a hall 5 m long and 1 m wide was discovered.
The team also performed rich expedition activities abroad. The Bosnia Expedition took place in 2013. The Club members explored and documented fluvial corridors 1 km in length in the Pola Cave. They surveyed 0.5 km of lacustrine corridors in the Komnica Resurgence.
The Namak Expedition to salt karst in the Zagros Mts., southern Iran, was realized in 2014 under the leadership of Michal Filippi. The studied sites included the Shah Alambdar salt diapir, the Namakdan salt diapir on the Qeshm Island, and the Kuhe Namak salt diapir where the Canyon Cave was surveyed. The Chulin Cave was explored on the Dzhahani salt diapir.
The Bosnia 2014 Expedition aimed at the Zukina Resurgence in the Javorník Highland.
In 2015, the tenth expedition was realized to table mountains in Venezuela, being composed of Czech and Slovak scientists. Exploration concentrated on the speleologically poorly known area of the western part of Akopán Mountain in the Chimantá massif. The longest found sandstone cave of Cueva Monika (length 1.2 km) is subhorizontal in its character. The river on its bottom disappears in a sand-filled sump.
In 2016, the Bosnia 2016 Expedition led to the Komnica Cave and to sites lying in the Žepa River canyon.

Caving Club Cunicunulus

The Club is engaged in mining history and exploration of historical underground spaces in the region of the Vysočina Highland. The Club rented a segment of the network of underground corridors under the town fortifications in Jihlava. These spaces are used for excursions. It also rented the most extensive underground maze system called Alfa, which also serves mainly for excursions.

The Club provided new survey and documentation of the Skalní Gallery (AG Gallery) after pumping of water. The gallery has a length of 43.6 m. The Club studied the underground part of the parish office in Přibyslav, historical underground spaces in Havlíčkův Brod, flooded underground spaces of a homestead at Nové Dvory in the Jihlava County. The Club members documented underground spaces exposed during the reconstruction of the square in Žďár nad Sázavou in co-operation with the regional museum. In addition, elementary exploration was made in the underground of the Okrouhlice Chateau: two corridors extending from the Renaisance tract of the cellarage were found.

Caving Club Plánivy

In the Amatérská Cave, sediment extraction continued from the bottom of the lower abyss in the Trativod Stream in the U dvou velkých Dome. A dive was realized in the Odtoková část (Outflow Part) of the Milana Šlechty Labyrinth in order to find outflow paths of the Punkva Stream in the Rodeo area. The maximum depth of the dive was 16 m; here, the level of the active flow was reached. Smaller spaces encountered at a depth of 4–5 m continue to the joints beneath the Rodeo area. An attempt was made to pump the sump to the Hikochodba Corridor in the Milana Šlechty Labyrinth. Abysses terminated by a water level were discovered at the end of the corridor. It appeared that the water abysses get narrower in their lower part, reaching the limit for passing through, which complicates the exploration by divers.

In the cave system of Piková dáma–Spirálka, exploration was continued in the levels above the Modrý Chimney. The team managed to penetrate from the Nad Kyvadlem Corridor to first sediment-free spaces, and discovered a continuation terminated by a narrow pass. Behind the pass, they reached a sediment-filled inflow corridor. An advance of about 15 m was achieved by hydromining. The total length of the Nad Kyvadlem Corridor thus reached 65 m.

In the 13C Cave, a pumping attempt was realized in the inflow sump. The lowermost achieved level in the sump was ca. –10 m. A large dome-like space started to emerge on the side of the 13C Cave at the end of the attempt. However, it could not be explored due to the coming flood.

A revised map documentation of the Plánivy Cave was completed in 2013. The overall cave length was set at 574 m with an altitude difference of 90 m.

Principal international activities of the Club are represented by the exploration of the Kačna jama Cave in Slovenia. Diving exploration of sumps resulted in the penetration to sediment-free spaces beyond the sumps, with a good prospect for further discoveries. Excavations at the site of Vitkov dihalnik, lying above the Kačna jama Cave at the end of the Slabetovo Lake, reached the depth of ca. 15 m. Nevertheless, no free spaces have been reached yet.

The year 2016 was marked by the first exploration of the Brezno pri Danah Abyss and by expeditions to the cave system of Črnelsko brezno in Slovenia. Individual Club members also participated in the exploration of the Andy´s Cave in Austria and in the expedition to China.

Caving Club Moravský kras

Activities of the Club centre around the Matalova Vymodlená Cave. Here, a dome with dripstone decoration was discovered (Osmdesátka) and two collapsed domes (Ryškův and Pavelkův). Later discoveries included a system of passages, the Slunovratový Dome, and the

Meandry and Spojka areas. All of them provide a plenty of promising sites for further research (Sisyfovo Lake, Šikmá šachta etc.).
Opening works were conducted at the Elfí domeček Ventarola on the Chobot Ridge. After the disassembly of the talus cone, the team was successful in reaching a solid wall along which opening works are continued in the direction of draught. A mercaptan experiment revealed an interconnection with the Kateřinská Cave, as expected.
Besides, the Club members took part in expeditions and research activities in caves not only in the Czech Republic but also abroad.

Caving Club Myotis

Research activities were conducted especially in the Propástka Abyss near the Verunčina jeskyně Cave. Steel ladders were installed in the lower level, and excavation of a test pit continued. Then, an attempt was made with filling of the pit with water 30 m^3 in volume. The water level in the cave rose to a total height of ca. 20 m and flowed away completely within approximately two days. The present cave depth is ca. 36 m. The exploration was discontinued after other unsuccessful attempts in 2016.
Opening and mapping works were conducted at the site of Žďár ponor. Prolongation works were continued in the Za Zmijí Passage in the Člupek Sinkhole. In the Agris Sinkhole, cleaning from temporary waste disposals was performed.
The Club members collaborated with other teams in the Czech Republic and Slovakia in the exploration of sites they supervise. Among others, these sites included the Býčí skála Cave, the Shaft beyond Evropa and Indie Cliffs, the Dagmar Cave, the caves of Nový Lopač and Vintoky, the Králova Cave etc. They also contributed to exploratory activities in the Duča Cave in the Slovak Karst and its subsequent interconnection with the Stratenská Cave.
The Caving Club maintains the Speleomuseum in a building of the local authority at Vilémovice.

Caving Club Devon

The principal site of the Club was the Okrouhlík Sinkhole. Here, extraction of loamy- and stone-dominated sediments continued, and other works were conducted also in the Jezírková Corridor. New survey of the cave was initiated. Deepening of the test pit was performed in the Irainova Cave. Regular events with minor discoveries were held at the site of Blešárna. Re-opening of the Nečasů Cave, much like excavation works at other promising sites, took place on Neselov Hill. Together with members of the Caving Club Pustý žleb, the Club members also participated in works in the Broušek Shaft, in the Nová Amatérská Cave and the Šošůvský Corridor, and in the opening of the Shaft beyond Evropa and Indie Cliffs.
The Caving Club was active in the Na Turoldu Cave and Blechatka Cave in the South Moravian Karst under collaboration with the Mikulov team. Surface exploration of the Pálava Mts. resulted in the discovery and survey of the Dívčí Cave (19 m) and Žebříková Cave (4 m). The Club assisted the Tišnov team at the sites of Nad Svratkou and Flek in the Tišnov Karst and the Lažánky-Heroltice Karst.
Outside the Czech Republic, the Club participated in studies in the Pestera de la Captare Cave in the Banat region and in the karst area around Bigar. It also contributed to the study of the Dalovica Cave in Montenegro. Other activities included diving in the Kessel resurgence, assistance to colleagues from Bohemia in an attempt to reach the terminal sump and dive in the sump in the Kühlloch Cave, Austria, and diving in the Silická Ľadnica Cave in Slovakia.

Caving Club Aragonit

The Club focused on field activities in the Hranice Karst, although many of its members participated in events organized by other clubs. In the Studna teoretiků (Well of Theoreticians), the Club members managed to remove the landslide of a water-saturated clay wall, which buried a mud pump in the well in 2014. The well received a new support.

Caving Club Pustý žleb

The main speleological site managed by the Club was the Shaft beyond the Evropa and Indie Cliffs, where re-opening of the collapsed shaft was carried out. Here, after digging to a depth of 24 m, the cave under the Shaft beyond the Evropa and Indie Cliffs was made accessible again after more than 52 years in 2016.

The Club members were also working at the sites of Nový Sloupský Corridor (Broušek Shaft) and Amatérská Cave. In the Šošůvecký Corridor, climbing exploration of chimneys in the Sloupských badatelů Dome was performed with a negative result.

An important component of the Club activities is represented by expeditions abroad – these include especially the regular cave diving Xibalba expeditions to the Yucatan Peninsula, Mexico. They concentrate on the prospection, interconnection and survey of new cenotes. During the last years, many kilometres of corridors were discovered. The efforts resulted in the prolongation of the Sac Kay system to the length of 11,551 m. The length of all known and surveyed caves in the studied area now totals 16 km. In addition, a survey of newly discovered spaces in the southern part of the K'oox Baal system was completed. With its length of 75 km, this system became the fourth longest flooded cave in the world.

The region of Banat in Romania is another traditional destination. Here, research was conducted mostly in the area of the Svatá Helena village with the Rajka Cave (Pestera Cicavalat). Other activities included surface excursions and exploration of a resurgence cave in the Susara River valley, and an expedition to the water cave of Pestera de la Captare, where a long corridor was found behind the sump, connected to other spaces. New spaces in a length of 614 m were surveyed, and spaces known since 1980s in a length of 220 m were newly measured.

In the Dalovica Pecina Cave in Montenegro, exploration and documentation of the cave continued. In 2016, over 2 km od corridors were measured during the survey.

China appears to be a new target for expeditions. In 2016, two expeditions to the Shaanxi Province in central China were undertaken, jointly organized by the Czech Speleological Society, Institute of Geology CAS, Institute of Karst Geology of the Chinese Academy of Sciences and the Geological Institute of Xi'an. During the two expeditions, corridors in a total length of 7,172 m were discovered and surveyed. The Shaanxi project is scheduled to be continued in 2017, too.

Speleohistorical Caving Club Brno

Výkopové práce pokračovaly v jeskyni Novodvorský ponor. V Závrtu u Borovice byla Excavation works were continued in the Novodvorský ponor Cave. In the Závrt u Borovice Sinkhole, a map, an expanded cross section and a plan of the cave were completed. Excavations in the Trucchodba Corridor resulted in the discovery of the Nohsledů Dome. Exploration of the Jižní Abyss was discontinued by the discovery of the Jožův Dome. The activities concentrated to the Severní Abyss: to the VyVe vertical and to the Nohsledů Dome. Penetration from the VyVe vertical interconnected the Severní and Jižní abysses in June 2016.

Several working events were organized at sites managed by other teams: most often to the Ochozská Cave and the Zkamenělá řeka Corridor. Excursions were undertaken to Slovakia, to the Banat region and Moldavia, to the historical underground spaces in Znojmo, Brno, but

also in Rome and Paris. Within these excursions, a collaboration was started with the Rome team of cavers and archaeologists Roma Sotterranea.

Caving Club allied to Podyjí NP

Works aimed at the adjustment of the entrance to the Silberloch Gallery were carried out.
Monitoring of the movement of blocks and climate was performed using the standard set of methods. Reports on the block movement were passed on to the Institute of Rock Structure and Mechanics CAS. Data from microclimate monitoring are archived at the Administration of the National Park. In addition, monitoring of bat fauna was conducted at the sites managed by the Club. In total, the presence of 20 bat species was evidenced. Also, excursions to the Jaskyne Driny Cave, Koněprusy Caves and Javoříčko Caves were organized.

Caving Club Babická speleologická skupina

The primary site of Club activities was the Větrná Abyss on the Babická Plateau. The Club members work at several sites here.
The Club members also participated in international events, especially in caves of the valleys of Jánská and Demänovská dolina in Slovakia. These events combined surveying, photographing and discovering activities.

Caving Club Orcus

The Club members are particularly engaged in the research of pseudokarst and historical and mining underground spaces in relation to the study of bat fauna. Chiropterological monitoring was performed regularly in caves of the Moravskoslezské Beskydy Mts. and in abandoned mine workings in the Jeseníky Mts. and Oderské vrchy Mts. A map documentation of bat wintering sites was elaborated for the Franc FrancMine in the Jeseníky Mts. and the "Pod Otáhalovými Dolní" Mine near Staré Oldrůvky.
Topographical works using digital techniques were completed in the Kněhyňská Abyss in the Moravskoslezské Beskydy Mts. with the purpose of drawing a new map. These works resulted in the discovery of some new parts of the cave.
In the Cyrilka Cave at Pustevny, the exploration of terminal points in the "Nová část" part of the cave brought a discovery of further continuation of the cave. The overall length of the cave was extended to 552 m. The Mraznica Cave 74 m long and 11 m deep was discovered at the altitude of 908 m in the slope of a peak in the central part of the Moravskoslezské Beskydy Mts. A map documentation of the Liščí díra Cave and Malá Kněhyňská Cave in SE slopes of the Kněhyně Ridge was completed.
Expeditions abroad were directed primarily to the Chatyr Dag Plateau on the Crimean Peninsula, and concentrated on documentation and survey.
Emine Bojir Chasar 2016 Expedition, May 21–29, 2016. Besides exploratory works, genesis of unique crystalline aragonite forms have been studied in the Emine Bojir Chasar Cave on the Crimean Peninsula by members of the Caving Club Orcus since 1981. The most problematic in the determination of the genesis of aragonite forms is the necessity of analyses of water and sediment samples and of crystals from this cave. In 2015, co-operation was started with staff members and speleologists from the Institute of Earth Sciences of the Slovak Academy of Sciences in Banská Bystrica. A joint approach towards the explanation of the origin and development of crystalline forms in the cave was established. Within the realization of this approach, an expedition was organized in the Emine Bojir Chasar Cave, which acquired over 100 samples of various kinds and produced a new map documentation of the cave. In addition, it discovered new spaces in this cave.

Exploratory works and subsequent documentation of the discovered vertical caves were carried out within the study of mass movements on the Morček Ridge in the Crimean Mts. Other excursions abroad included those to Spain, France, Tenerife Island, Cuba, Austria and Poland. Co-operation was started with Brazilian cave diving clubs with a prospect of an expedition to the Bahia region.
The Club organized regular one-week training course of speleoalpinism for students of the Academy for Legislation and Safety in Ostrava. The course was held at the Malé Svatoňovice centre and in the Adršpach-Teplice Cliffs. Members of the Club significantly contributed to the activities of the Commission for Speleoalpinism of the CSS and showed extensive publication and lecturing activities.

Caving Club Hranický kras

Research was principally focused on the Hranice Abyss where surveying and documentation activities took place. A descent of a diver to the maximum depth of –265 m was achieved; during this descent a connection leading to new tracts of the abyss was discovered at a depth of –240 m. A descent of an underwater robot ROV Gral Marine was realized in 2016, when the depth of –404 m was reached, moving the Hranice Abyss to the imaginary position of the deepest flooded freshwater cave in the world. This success has been documented by the National Geographic within the project "Hranice Abyss – a step beyond 400 m".
Other activities concentrated on the drill of emergency procedures in a rescue of divers from the flooded portions of the Hranice Abyss, and from the caves of 13C and Býčí skála in the Moravian Karst. These events were organized in cooperation with the Speleological Rescue Service of the Czech Speleological Society – Moravian station.

Caving Club Javoříčko

Prolongation activities were continued in the Za hájovnou Cave, where new, dripstone-decorated spaces were reached. The length of the new spaces of 70 m gives the total cave length of 966 m at this moment. Excavations were started in a joint called Komáří jeskyně (Mosquito Cave) not far from the cave entrance. It represents a paleoponor with a sediment-filled, perfectly shaped stream corridor 11.5 m in length.

Caving Club Sever

In the Na Pomezí Cave, a complex labyrinth called Svatomartinská křižovatka (St. Martin Crossroads) was discovered and explored. In the Rasovna Cave Na Pomezí, exploration of the Královský Chimney was conducted, among other activities; it resulted in the discovery of the Černobílý Chimney. Low water level in the Za Hájovnou Cave at Lesní Čtvrť near Vápenná permitted to pass through both sumps, previously explored by the divers. The corridor was thus prolonged as far as to the terminal impassable meander. The Zapomenutá Cave Na Pomezí was explored again: after the discovery of a relatively complex system of underground spaces, the original length of the cave of 13 m was prolonged to 158 m with an altitude difference of –13 m. This situation is promising for future discoveries.

Caving Club Mladeč–Vojtěchov

The Club was active in the V Rachavách Cave and in the Kadeřínská Cave. The terminal sump in the V Rachavách Cave was successfully passed through and newly discovered spaces were documented. Further advance was prevented by another, more complicated sump. In the Mladeč area, maintenance activities concentrated to the Ve štole Cave. Besides, electric resistivity measurements were taken at selected sites at Třesín.

Caving Club Sovinec

At the site of Sovinec–quarry, prolongation and documentation activities and safeguarding works were conducted in Cave No. 4. The Club members also documented mine workings in the region of Nízký and Hrubý Jeseník Mountains.

Caving Club Estavela

Principal research activities were conducted in the Javoříčko Caves and in the whole massif of Špraněk Hill. Activities at the upper level of the Javoříčko Caves concentrated to the Olomoucký Dome area. Works in the Závaľ (Collapse) area managed to free another chimney from collapsed material in the Východní Chimney and to penetrate upwards into a prominent corridor controlled by a vertical joint perpendicular to the dominant N–S trend of the Vojtěchovská Corridor. In eastward direction, club members managed to enter new, vertically differentiated spaces, mostly filled with collapsed material, directed towards the Na Šplázu Quarry. Other new excavations continued on the western side of the Závaľ area: here, it is still possible to advance along the dome wall towards the south. A minor discovery was marked on the bottom of the Vstupní Abyss of the Švecova díra Cave. A revised survey of the Vojtěchovská Corridor was completed including the spaces of the so-called Očistec, the Švecova díra Cave and side passages of the Závrtový Dome.

Spaces around the Lví jáma Abyss were explored at the mid levels of the caves. Here, spaces drawn on the Vodička map of 1950s were re-discovered, and a revision of the survey was made for the whole system. The main activities were, however, aimed at prolongation of the Křišťálová Cave in the Medvědí jáma Abyss system. These led to the discovery of the so-called Nová cesta (New Way). Survey of the area Pod Palmou was made, and survey of the Objevná cesta (Discovery Way) was first completed as far as to the Gigantů Dome.

Geophysical survey using the DEMP and ARES methods was finished in the Špraněk Hill area in co-operation with the Faculty of Science of the Palacký University in Olomouc. Works on 3D surface maps of Špraněk Hill were initiated with the aim to create a 3D model of the Javoříčko Caves.

In October 2014, the Club organized the Meeting of Speleologists in the Javoříčský Karst, participated by ca. 150 cavers from 27 clubs from the Czech Republic, Slovakia and Poland.

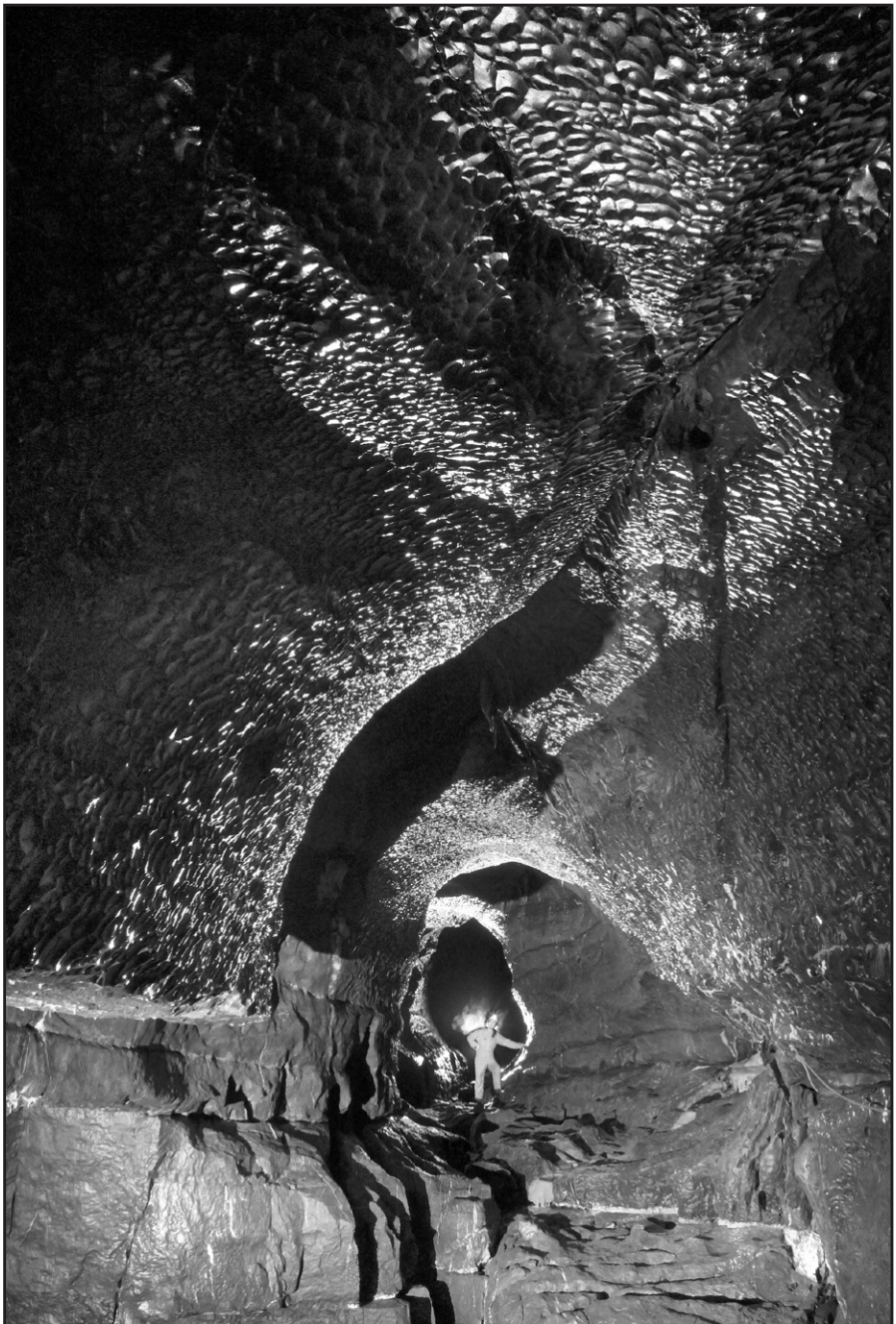
Caving Club Hádes

The Club conducts the research of historical underground spaces and mine workings. Activities for the opening of the lower part of the Poštovní Gallery in the Zlaté Hory area for the public were realized for the DIAMO, state enterprise. Field reconnaissance was conducted in the area of Příčná hora Hill, and visits of other historical mine workings in the area were organized.

Caving Club Ludmírov–Štymberk

The Club continued exploratory works at the Na Srdečku site. Modifications of the "new" entrance (driven in the last few years) and electrification of the cave were completed. Further advance in upstream direction brought about prolongation of the known cave spaces by ca. 4 m.

The Most Important Discoveries in the Czech Republic in 2013–2016



The Hranice Abyss became the deepest underwater abyss in the world!

Jan Musil

An event focused on deep exploration took place at the Hranice Abyss (fig. 1) on Tuesday, September 27, 2016. The event was organized by the members of the Hranický kras Caving Club of the Czech Speleological Society in co-operation with staff of the Nature Conservation Agency of the Czech Republic – branch Olomouc, with members of the Department of Special Diving Activities and Training of the Police of the Czech Republic, and with the team of Bartolomiej Grynda of the Gral Marine Company which provided a remotely controlled underwater robot including its operator for the deep exploration.
During the event, Krzysztof Starnawski (photo 1, 2) installed the navigation–orientation line from the Zubatice space to the Mikado restriction to a depth of ca. 200 m. This was followed by the installation of pulleys for the navigation cable of the robot at the water level and at a depth of around 60 m in the Zubatice space. From this point, the robot descended independently through Lift I to the Mikado restriction, being operated from the water level by Bartolomiej Grynda. Further on, the robot continued its descent along "measuring" lines installed in Lift II by Krzysztof Starnawski during previous events, until it reached the depth of 370 m. There, the robot operator departed from the navigation line and continued "instinctively" to the depth along the wall (photo 3). The exploration had to be stopped at the maximum achieved depth of 404 m due to the limit of the navigation cable of the robot (photo 4). The abyss continues further down, and 404 m is by no means the ultimate depth (Musil 2017)!

References:
Musil J. (2017): The Hranice Abyss became the deepest underwater abyss in the world! – *Speleofórum*, 36: 10–15. Praha.

Photo 1 K. Starnawski is getting ready for a deep descent (Photo by M. Jamkowski)

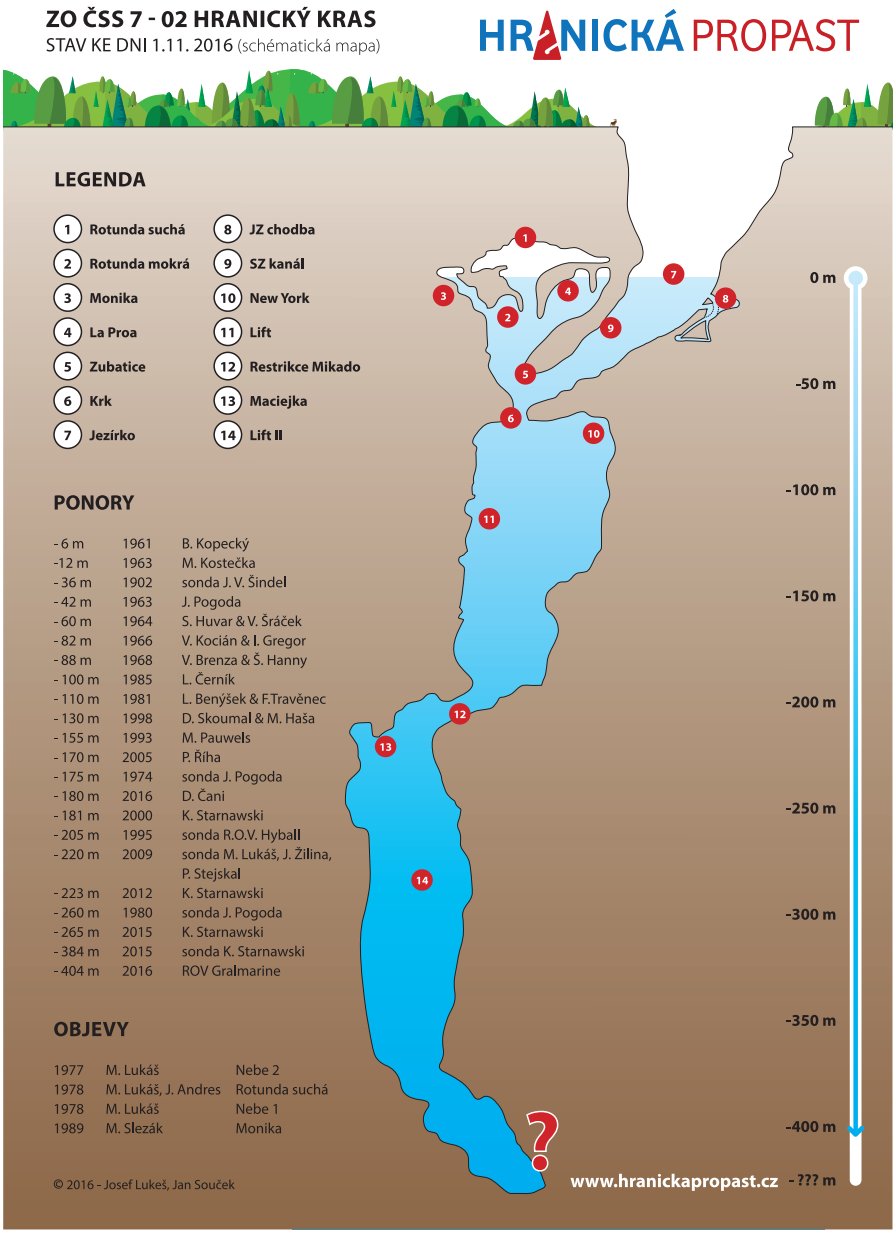


Fig. 1 A schematic map of the Hranice Abyss, as of November 1, 2016 – descents, discoveries (Author J. Lukeš, J. Souček)

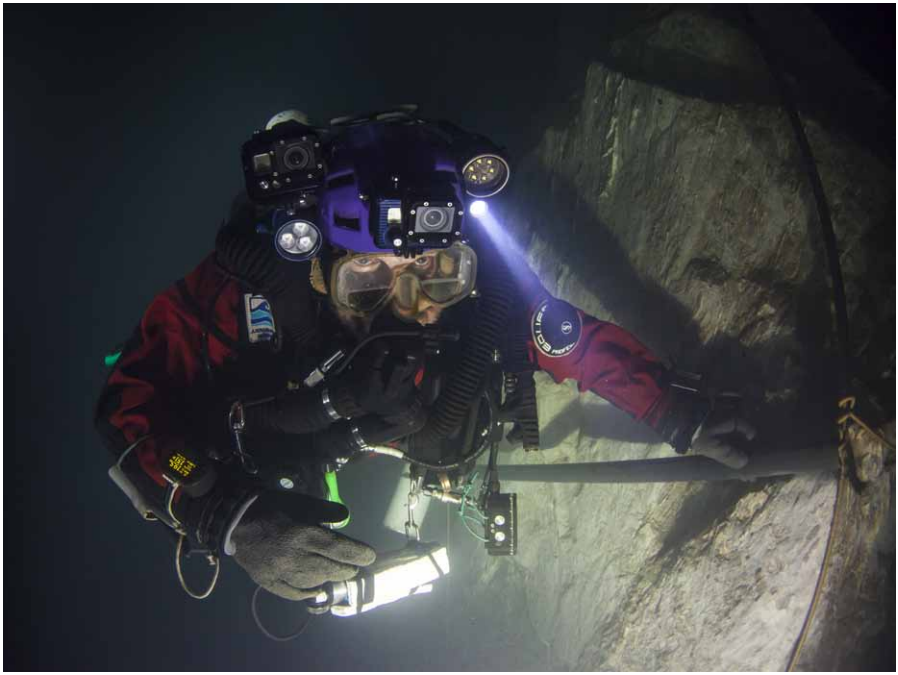


Photo 2 Krzysztof Starnawski during a decompression stop at -18 m
(Photo by © Marcin Jamkowski / Adventure Pictures)

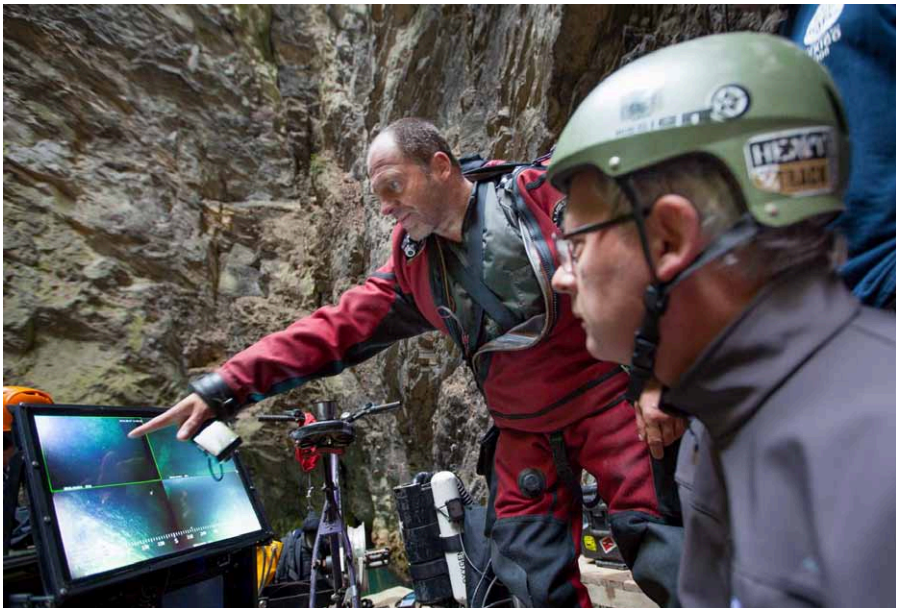


Photo 3 K. Starnawski guides the robot operator through narrow spaces of the cave
(Photo by © Marcin Jamkowski / Adventure Pictures)

Hydrogeological research of the Hranice Abyss within the project of Neuron Expedition – preliminary results

Helena Vysoká

The Hranice Abyss is an interesting and unique karst locality. It has been proved to be the deepest flooded abyss in the world by ROV testing in September 2016. Its final depth as well as its shape below 200 m have not been recognized yet. The survey of this site, realized by members of the Czech Speleological Society (caving club Hranický kras), has been conducted since 1961. During 2015–2016, a hydrogeological research project called "Neuron Expedition" took place there (Vysoká 2016). A combination of various methods was used to describe water properties (chemical, physical, hydraulic) in space and time scales, flow regime and mean residence time. Some new data were obtained (e. g., a detailed record of temperature, pH, conductivity, redox potential, dissolved oxygen with depth and time, chemical composition of water at representative sites and its time evolution (fig. 1). Some sites were discovered where the course of the measured parameters varies (fig. 2). The depth of the sites as well as the trends in the measured parameters vary in time. Tritium analysis showed that water in the abyss presents a mixture in which most water was infiltrated before 1950. CFC analysis in the "Teplý vývěr" outlet revealed mixing of two components: subsurface modern infiltration and deep reservoir tributary with a mean residence time of around 300 years. The question of visibility changes is obviously a complex one, and can be also partly explained by microbial activity (fig. 3). Preliminary results show that the Hranice Abyss is a very complicated hydrodynamic system (Vysoká 2017).

References:

Vysoká H. (2016): *Hydrogeologický výzkum Hranické propasti*. – Nepublikovaná Závěrečná zpráva pro projekt Expedice Neuron nadačního fondu Neuron: 1–265. Praha.

Vysoká H. (2017): Hydrogeological research of the Hranice Abyss within the project of Neuron Expedition – preliminary results. – *Speleofórum*. 36: 16–21. Praha.

Neuron Expedition – M. Strnad with cases used for water sampling (Photo by H. Vysoká)

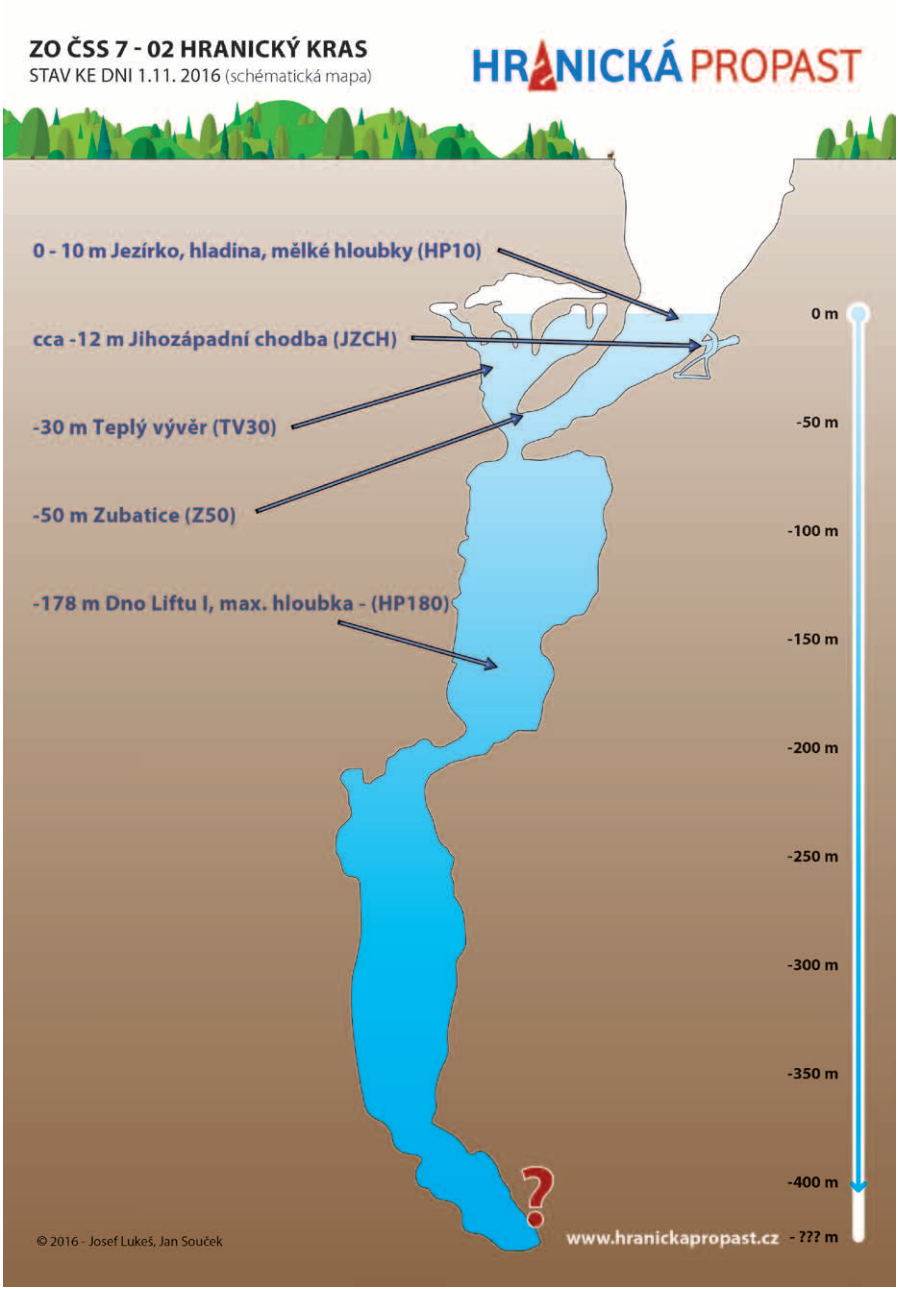


Fig. 1 A scheme of sampling sites in the Hranice Abyss
(Author J. Lukeš, J. Souček)

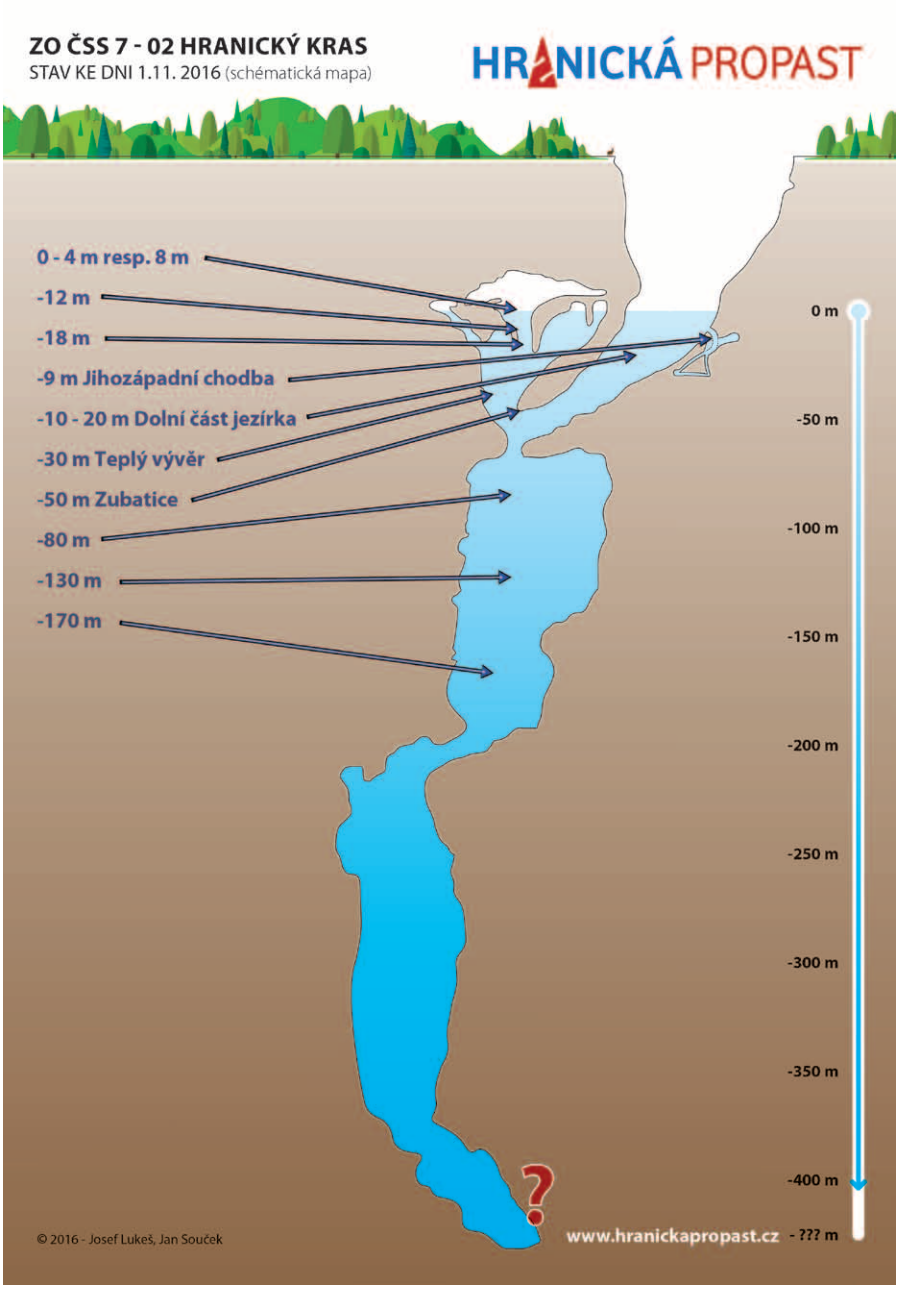


Fig. 2 Sites with changes in conductivity, temperature and pH of water (Author J. Lukeš, J. Souček)

Raft stalagmites in the Hranice Abyss, the Hranice Karst

Milan Geršl, Fraňo Sabbath Travěnec, Libor Čech, Martin Strnad

The Hranice Abyss (HA), originally called just Abyss (e. g., Komenský 1627), is the largest and presently most renowned surface landform of the Hranice Karst. The Hranice Karst lies in the NE part of the Maleník Block, which is a segment of the Moravo-Silesian Paleozoic. The Hranice Karst is a karstic area with an indispensable proportion of hydrothermally generated karst objects. Hydrothermal karstification is a process which also created the Hranice Abyss, now the deepest underwater abyss in the world.

Raft stalagmites (RAS) are slender, conical flowstone forms, which are shaped by the accumulation of floating flowstonecrusts – rafts (Geršl 2013). Water in the Hranice Abyss is mineral water – acidulous water with high amounts of dissolved calcite and carbon dioxide (e. g., Geršl 2016). Calcite starts to crystallize on a free surface of lakes, where degassing of these waters (i. e., release of carbon dioxide) occurs, having the appearance of floating flowstone crusts – so-called rafts. Freely floating rafts finally tend to submerge by the effect of water dripping from the cave ceiling. At the impact site, the rafts accumulate to form a settling cone – a raft stalagmite. In the Hranice Abyss, such stalagmites were observed to be deposited at depths not exceeding ca. 6 m. Rafts submerged into larger depths become dissolved. The first RAS in the Hranice Abyss were distinguished by the cave diver Fraňo Travěnec on September 2, 1978. They had the character of slender cones located on the NW end of the Čistá trhlina (Clean Crevasse).

Photo 1 A raft stalagmite in the eastern part of Nebe I (Heaven I), with the cave diver M. Strnad at the front (Photo by F. S. Travěnec, 2009)

In the nearby Zbrašov Aragonite Caves, carbon dioxide was protecting the secret of the origin of geyser stalagmites, now called raft stalagmites, for almost ninety years. The presence of this suffocating gas was a silent and effective argument against the entry of enthusiastic explorers to the proximity of alleged geyser stalagmites. Consequently, the structures of the stalagmites could not be studied in detail, and samples for laboratory study could not be acquired. The so-called geyser stalagmites were discovered in the Hranice Abyss as early as in 1978. In such environment, these unique forms are protected not only by carbon dioxide, but also by the depth of water and by tight narrows. Only exceptionally can a good cave diver with appropriate experience reach such places. Experience of the diver should then allow for further scientific documentation, field measurements and sampling (Geršl, Travěnec, Čech, Strnad 2017).

References:
Geršl M. (2013): Výsledky novodobých výzkumů a model geneze raftových – gejzírových stalagmitů. – *Acta speleologica*, 4: 38–47. Průhonice.
Geršl M. (2016): Rozlišení vod Hranického krasu na základě archivních analýz. – *Zprávy o geologických výzkumech v roce 2015*, 49: 247–252. Praha.
Geršl M., Travěnec S. F., Čech L., Strnad M. (2017): Raft stalagmites in the Hranice Abyss, the Hranice Karst. – *Speleofórum*, 36: 21–24. Praha.

Exploratory works in the Býčí skála cave system, Czech Republic

Milan Skoupý, Jiří Kukla, Jiří Svozil st.

The Býčí skála Cave lies in the central part of the Moravian Karst in the Czech Republic, north of the city of Brno. Together with the Rudické propadání caves and the Barová Cave, it constitutes the second longest cave system in the Moravian Karst and in the Czech Republic in general, totalling almost 20 km in the length of known corridors. The system hosts the Jedovnický potok Stream in the length of 6.5 km.
The entrance tract of the Býčí skála Cave, cca 350 m in length, has been accessed since very early times, being visited by humens since Prehistoric times. In 1867, Jindřich Wankel exhumed a Paleolithic settlement in the depth of the cave and made a world-famous find interpreted as a burial of a Halstatt nobleman in the Předsíň (Hall) area five years later. In addition, the Býčí skála Cave and the near Barová Cave are important paleontological sites.
A systematic speleological exploration has been conducted uninterruptedly since the latter half of the 19th century in the Býčí skála Cave. Hereat, a number of techniques unique at their time were used (sump pumping since 1899, cave diving in 1912, hydromining since 1999). In the first half of the 20th century, the research was conducted by members of the Cave Section of the German Tourist Club (Gruppe für Höhlenforschung des Vereines deutschen Touristen Brünn). They discovered upper levels of the Brunina Cave and Skalní zámek Cave using climbing equipment. They also discovered the Nová Býčí skála Cave with the active flow of the Jedovnický potok Stream by pumping the Šenk Sump in 1920. Starting from 1954, the research has been led by Caving Club Býčí skála. Information on the activities of this team is available through webpage www.byciskala.cz.
The latter half of the 20th century was marked by innumerable attempts to reach beyond the inflow sump of the Nová Býčí skála Cave. In this process, many new spaces were discovered. Other spaces further upstream the Jedovnický potok were made accessible only after a gallery by-passing the inflow sump had been driven in 1984. These spaces were progressively

Photo 1 Býčí skála Cave, survey of the Komín u netopýra (Bat chimney) (Photo by F. Musil)

explored until reaching the system of the Rudické propadání Cave.

Efforts in the 21st century concentrated on the explanation of the origin of the resurgence delta of the Jedovnický potok Stream. Pumping, hydromining, the use of climbing techniques and other methods led to the discovery of many new spaces. The most significant ones include the Augiášův Dome with adjacent passages in the phreatic zone (Prasečí kanál, Florida Beach, 1999), the complex system of passages of Buzgaňg, Kóta 314 and Balkóta (2002–2005), dry path to the Májové caves (2005), Jezerní Dome (Barová Cave, 2007), Svozilova Cave (2009), the domes of Křížový and Dóm ticha accessed after an extensive pumping at the active flow of the Jedovnický potok Stream (2011), further HMŠ and Odporný Chimney (2011–2013), the Zlomených vrtáků Passage (2012), the passages of Fialová and Nová Fialová with interconnection to HMŠ (since 2013), the passages of Kočárová and Labilní (2014), the Kokosová Passage (2016) and the Květáková Passage (2017). Progressive exploration of the phreatic zone has been conducted since 2002. The total length of spaces discovered using these methods amounts at several kilometres.

The use of non-traditional technical solutions proved to be necessary in 1999 already, when activities in the bottom of the Šenkův Sump were started. Sedimentary fill was disintegrated by pressurized water and then removed by mud pumps. This “hydromining” method was constantly improved and gradually became an essential method of prolongation works. Advances achieved by this method were unimaginable before, when classic methods were applied. Nevertheless, electrification of the cave was needed, in addition to the employment of considerable amounts of technologies and material: pressure pumps, mud pumps, pressure piping and hoses, power distribution and pump controlling systems. The hydromining method is very effective, although financially demanding.

Exploratory works at the active flow of the Jedovnický potok Stream called for the regulation

of stream discharge. For this purpose, a dam was constructed in the Kaňony Passage in the Nová Býčí skála Cave. This permitted a complete discontinuation of water flow, pumping of sumps lying downstream of the dam, and exploration of those tracts of the cave which were flooded or cut-off by the active stream. The construction and remote-controlled opening of the dam represented the topmost technical achievement in the exploration history of the cave. The complex research in the last years revealed that the cave system in the resurgence part of the stream is much more complicated than could be presumed by our predecessors. The system is incredibly intricate not only at the level of the active stream but also at the upper levels and in the phreatic zone lying deep under the active stream. The upper levels reach more than 100 m above the stream whereas a horizontal level typical for the phreatic zone lies at a depth of 15 m under the stream level. The whole system was formed by atmospheric drainage in combination with subsequent re-modelling by the Jedovnický potok Stream. Fluvial corridors with allochthonous gravel fill were, however, also found at considerable heights. Signs of frost weathering were identified at the topmost cave levels, which suggests a rather deep reach of frost in the rock massif in the last glacial periods (Kukla, Skoupý, Svozil 2017).
Besides speleological research, the Caving Club also conducts extensive paleontological studies of Pleistocene fauna in the Barová Cave in collaboration with the Anthropos Institute of the Moravian Museum in Brno. Results of these studies are presented in a separate section.

Reference:
Kukla J., Skoupý M., Svozil J. (2017) : Disclosing advances in the areas of Hlinité síně and Jihovýchodní zlom in the Nová Býčí skála Cave. – *Speleofórum*, 36: 40–45. Praha.

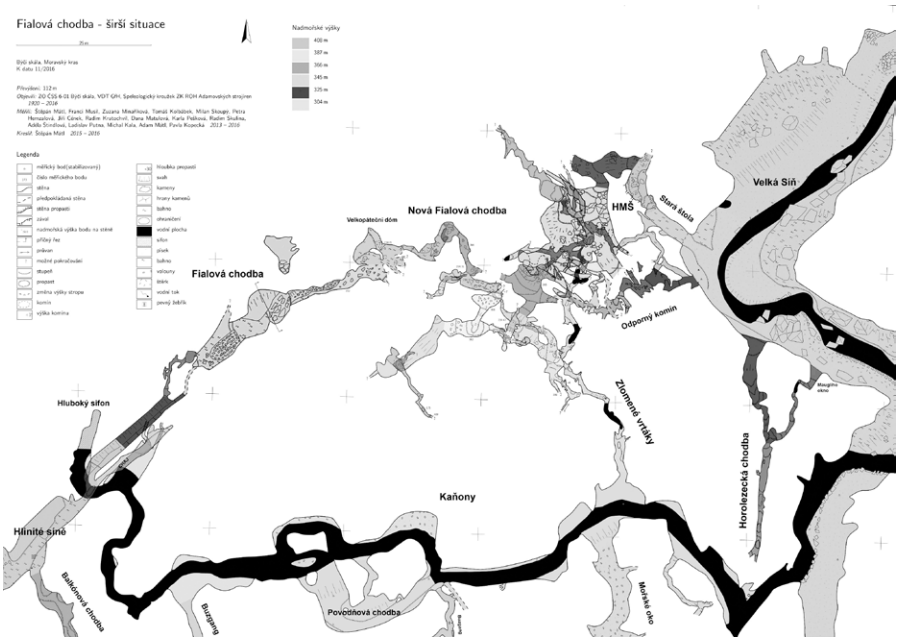


Fig. 2 Situation around the intersection of the Jihovýchodní zlom (Southeastern Fault) with the tectonic line of Hlinité síně (Loam Halls Fault), as of the end of the year 2016 (Drawing by Š. Mátl)

Paleontological research in the Barová Cave, Moravian Karst: preliminary results for years 2013–2017

Vlastislav Káňa, Martina Roblíčková

The Barová Cave is a part of the Býčí skála – Rudické propadání cave system, forming its most distant resurgence segment. It was discovered by A. Sobol and his students in 1947 (Sobol 1948). Paleontologically significant Late Pleistocene sediments, overlying older sediments, were disclosed within the earliest exploratory works already (Strnad 1949). Two extensive paleontological research campaigns took place in the cave in the last century. These studies were conducted by R. Musil in 1950s and under the leadership of J. Svoboda and L. Seitl in 1980s (Musil 1959, Seitl 1986). The present paleontological research was started in 2011. Six test pits were excavated in the intricate complex of talus cones and cave loams. The Medvědí Corridor Pit was located in the space previously incompletely covered by the research of L. Seitl (Seitl 1986, Roblíčková, Káňa 2013). The other test pits were also excavated at sites which had been previously exploited but still reached some entirely intact horizons. The most successful was the Pod žebříkem Pit, localized between the presumed excavations of R. Musil and L. Seitl, which alone yielded about 10,000 bones of Pleistocene fauna. Sediments at this site can be characterized as a sedimentary mound of an irregular fan shape, consisting of three basic units. These are composed of sediments from different parts of the cave but were deposited continuously one after another with no hiatus. Most of the sediment transport occurred only after the disappearance of large fauna.

As yet, our research produced skeletal remains of 21 vertebrate species from the Last Glacial, totalling over 15,000 bones and bone fragments. The obtained 14C data ranked this fauna to the time interval of 45,000–50,000 years BP. In its composition, the fauna rather corresponds to the interstadial, i. e. a warmer fluctuation within the Last Glacial. It is clearly dominated by bears of the cave bear group *(Ursus ex gr. spelaeus)* whose bones represent more than 95 % of the processed finds. Both sexes of bears are present in all age populations. The pre-sence of very young individuals, neonates and foetuses is regular but not very frequent. The presence of these young individuals, however, proves that the cave was used by female bears for deliveries. A large portion of the found bear bones come from younger adult individuals. In contrast, remains of very old bears are very scarce in the cave. It can be expected that the processing of all bear bones recovered from the Barová Cave will show pertinence of these bones to over 100 individuals of bears of the cave bear group. The cave lion *(Panthera spelaea)* and cave hyena *(Crocuta c. spelaea)* pose peak predators and scavengers, respectively, of interstadial faunal communities in the Moravian Karst. As yet, research in the Barová Cave yielded skeletal remains of at least eight individuals of the cave lion. Adult as well as subadult individuals are present, males and females, healthy individuals and those with bone pathologies. Bones of cave hyenas and wolves *(Canis lupus)* were found in lower numbers than the lion bones in the Barová Cave. A small part of bear bones (5–10 %) shows traces after biting (bite marks) left by hyenas and lions, probably also wolves. Weakened bear individuals, or possibly young individuals, were probably hunted down by the predators from time to time. In most cases, however, these predators were feeding on bones of bears who died in the cave before. Smaller predators whose bones were found in the cave so far include separate fox bones of the red fox type, bones of the lynx, wolverine and marten. Notable among large predators are the several bones of the brown bear *(Ursus arctos* cf. *priscus)*. Remains of the prey of the predators include separate bones of the reindeer, elk, bison or aurochs, rhinoceros, chamois, ibex and the northern

pintail. Rare bones of hares and small rodents (earth dog, lemming) are most probably just remains of the prey of smaller predators.

The fossil assemblage of the Barová Cave probably represents fauna of the interstadial of a karst valley. The site was largely used by cave bears for hibernation and for breeding of offsprings, most probably for a time period of at least several thousand years. Large predators were entering the cave mostly for scavenging and predation on weakened cave bear individuals. Anyway, they may have equally used the cave as an occasional hideout (senile or wounded lions, hyena dens).

The Barová Cave is currently the only cave in the Czech Republic with ongoing paleontological research of such extent. It is open to scientists as well as students: it is the site of training of students of the Faculty of Science of the Masaryk University in Brno. After the last stage of research, scheduled in the entrance tract of the cave, the exposed excavations will be preserved for the next generation of researchers.

References:

Káňa V., Roblíčková M. (2013): Barova (Sobolova) Cave, Moravian Karst (Czech Republic) Upper Pleistocene Fosiliferous In-Cave Sediments Instructive Paleontological Excavations. – In: Filippi M., Bosák P. (eds.): *16th International Congress of Speleology Proceedings,* vol. 1: 133–138. Czech Speleological Society, Praha.

Musil R. (1959): Jeskynní medvěd z jeskyně Barové. – *Acta Mus. Moraviae, Sci. nat.*, 44 (1959): 89–114.

Roblíčková M., Káňa V. (2013): Předběžná zpráva o novém paleontologickém výzkumu v jeskyni Barové (Sobolově), Moravský kras. – *Acta Mus. Moraviae, Sci. geol.*, 98: 111–127.

Seitl L. (1988): Jeskyně Barová (Sobolova), její osídlení a savčí fauna ze závěru posledního glaciálu. – *Acta Mus. Moraviae, Sci. nat.,* 73 (1988): 89–95.

Sobol A. (1948): Nová jeskyně u Býčí skály. – *Československý kras,* 1 (1948): 60–65. Brno.

Strnad V. (1949): Fauna Barové jeskyně pod Krkavčí skálou u Adamova. – *Československý kras,* 2 (1949): 123–127. Brno.

The most important discoveries abroad in 2013–2016

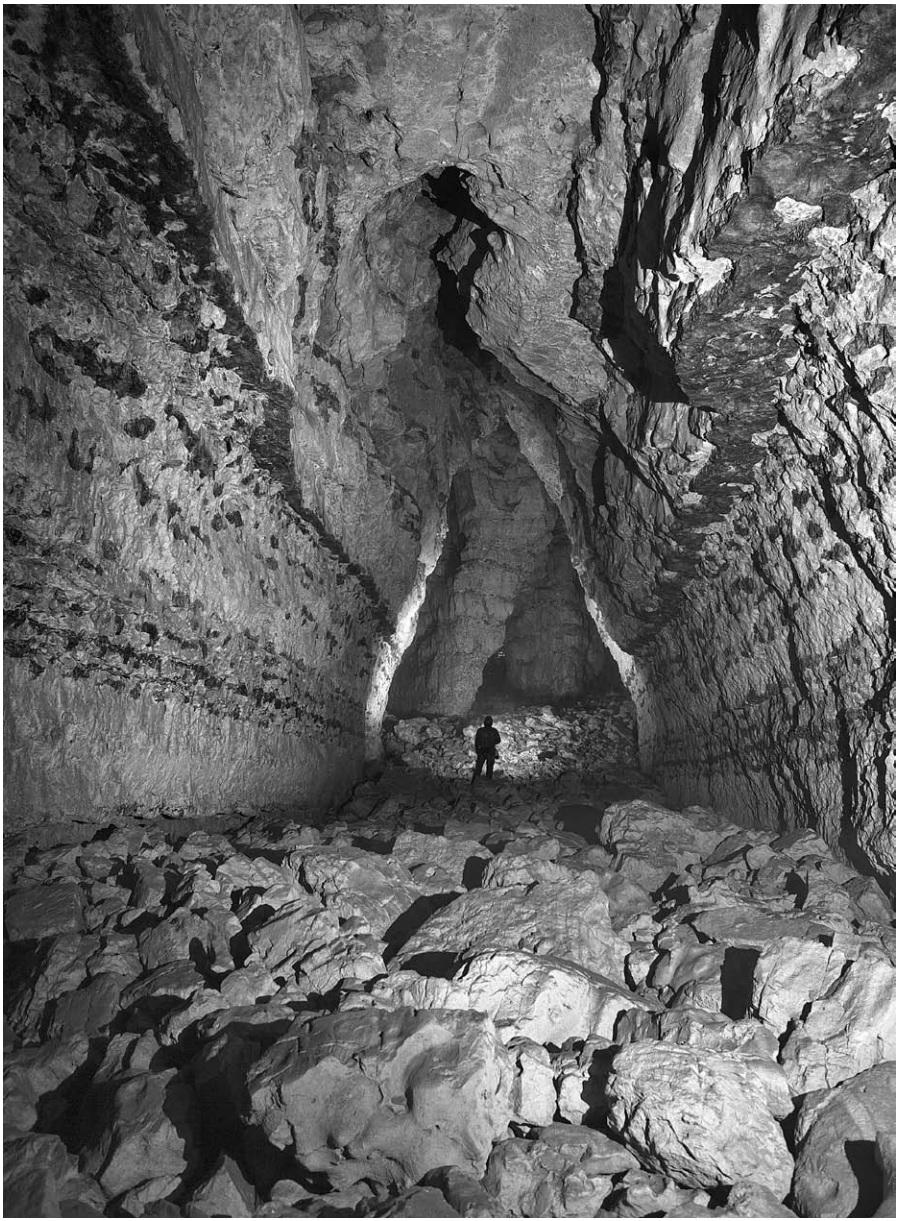


Photo 1 A passage below the second entrance in the Guanyindong Cave, Shaanxi, China (Photo by Z. Motyčka)

Cave exploration in Xiaonanhai karst area, Shaanxi province, China

Zdeněk Motyčka, Michal Filippi

Thanks to a detailed study of satellite images, a new extensive karst area was disclosed south of Hanzhong City in Nanzheng County, Shaanxi Province. A speleological project was established in cooperation of the Czech Speleological Society, Institute of Geology of the Czech Academy of Sciences, Institute of Karst Geology of the Chinese Academy of Sciences in Guilin and Shaanxi Geological Institute in Xi´an in May 2016.

The first expedition took place in late May 2016. The team consisted of 5 members: Michal Filippi, Libor Matuška, Zdeněk Motyčka, Roman Šebela and Zhang Yuan Hai. The expedition was aimed at the reconnaissance of three interesting karst areas selected using a Google Earth application (GE); however, as it turned out later, two areas were impossible to visit. One area was not allowed for foreigners and the other one was closed because of a slope failure that destroyed the access road. Therefore, our main focus was aimed at the karst plateau south of Xiaonanhai village in the Hanzhong District. Hanzhong is located in the Nanzheng County on the Han River in the southwestern part of the Shaanxi province in central China. Geologically, the whole area spreads in the transitional zone between the Yangtse Plate and the Qinling orogenic belt system. The whole area covers about 5,000 square kilometers of carbonate rocks that form morphologically different types of surface from rolling to mountainous terrain, through karst plateau to medium-developed cone karst. Karst forms are ubiquitous, but usually covered with dense vegetation. Typical are blind valleys, canyons, cave portals, abysses and sinkholes of various proportions.

The highest summits of the local mountains usually reach 1,500–2,100 m above sea level. Limestone of the Wujiaping Formation of Permian age is the most common rock in the region, alternating with clays, shales, dolomitic limestones, cherts and other beds or interbeds of sedimentary rocks of Permian to Jurassic ages.

Climate in the area is mild to subtropical. Average temperatures reach 26 ºC in summer and 4 ºC in winter, but climate in the mountains is cooler with average winter temperatures below freezing-point, which means that snow is relatively common. However, mean annual precipitations of 700–1,100 mm are not abundant in general, if compared to e. g. southern China (much more visited by tourists). Long-term drier climate is also the reason why the cone karst of central China is not as perfectly developed as that in the Guilin area in southern China with cones and towers up to 300 m high.

The study area is located southeast of the village of Xiaonanhai. It consists of a northerly to northeasterly inclined limestone plateau (or even a relic of a much larger plateau) with an area of about 7 × 5 km, limited by an incised valley in the south and west. It is flanked by mountain ranges and then high cliffs towering above the otherwise relatively flat surrounding landscape. In the north and east, the plateau continues with wild mountainous karst landscape with deep valleys and canyons. The plateau is gently undulating to flat, with a complex network of shallow valleys with permanent or intermittent streams, which mostly terminate in sinkholes with cave portals or in abysses up to several tens of meters deep. The whole plateau is only minimally populated, covered with a dense subtropical forest. Only a small portion along the roads is deforested due to growing tobacco and other crops.

The second expedition took place in October of the same year with the following participants: Jiří Buček, Radoslav Husák, Miroslav Kotol, Libor Matuška, Štěpán Mátl, Tomáš Mokrý, Zdeněk Motyčka, Jan Sirotek, and Zhang Yuan Hai. The main purpose of this expedition was to continue the exploration and documentation of karst phenomena in the Xiaonanhai area.

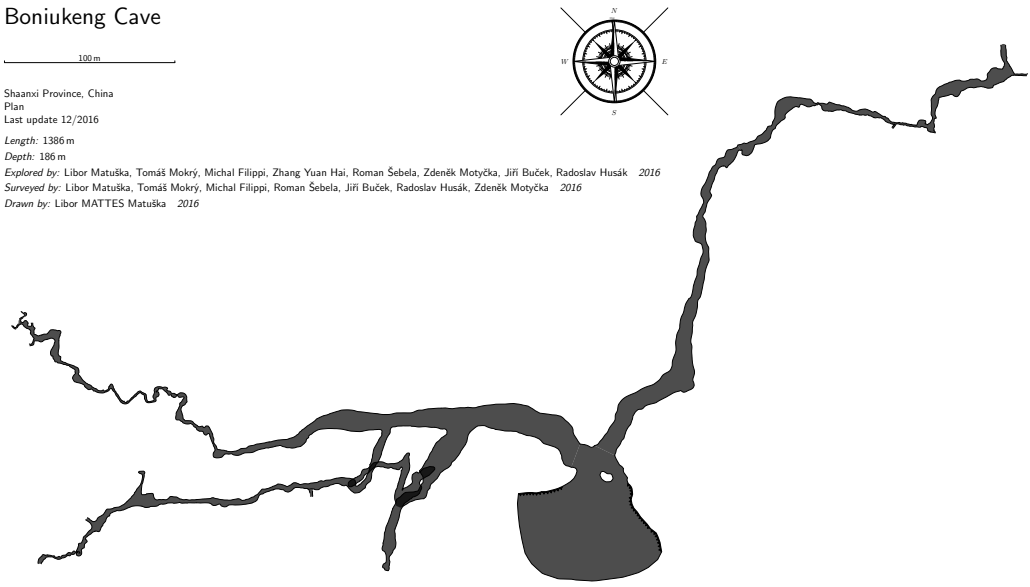
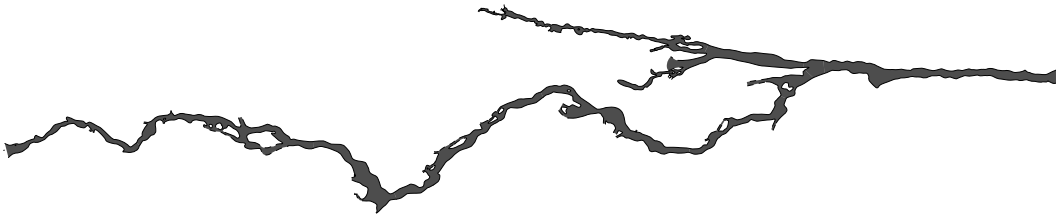


Fig. 1 A map of the Boniukeng Cave, Shaanxi, China



Guanyindong Cave

250 m

Shaanxi Province, China
Plan
Last update 11/2016

Length: 3024 m
Depth: 445 m
Explored by: Štěpán Mátl, Jan Sirotek, Zden
Zhang Yuan Hai *2016*
Surveyed by: Štěpán Mátl, Miroslav Kotol, Zd
Drawn by: Štěpán Mátl, Jan Sirotek *2016*

Fig. 2 A map of the Guanyindong Cave, Shaanxi, China

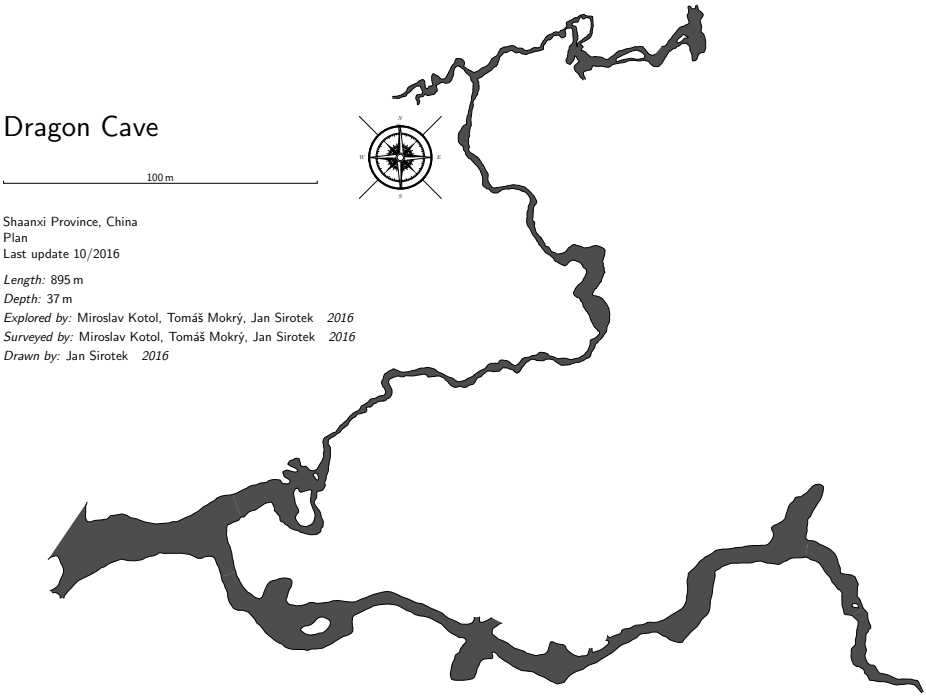
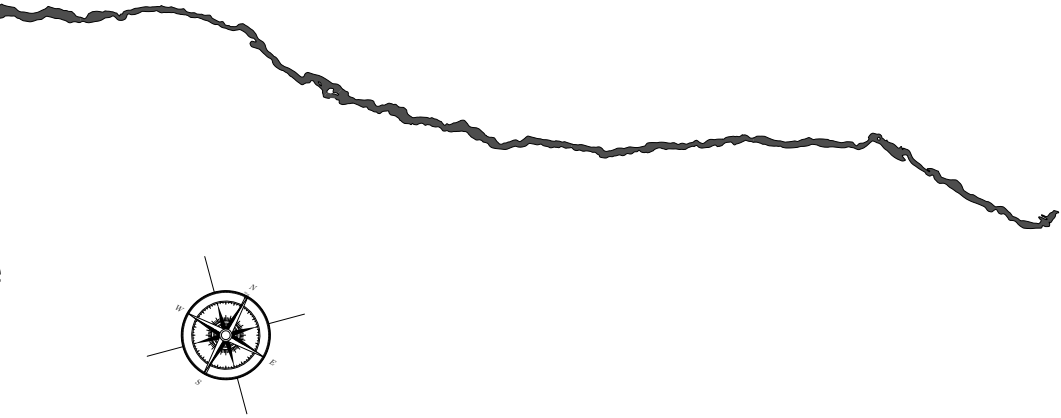


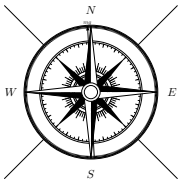
Fig. 3 A map of the Dragon Cave, Shaanxi, China



ěk Motyčka, Roman Šebela, Miroslav Kotol,

eněk Motyčka, Jan Sirotek *2016*

Diao Dong / Nikita's Cave



100 m

Shaanxi Province, China
Plan
Last update 11/2016

Length: 704 m
Depth: 45 m
Explored by: Štěpán Mátl, Jiří Buček, Libor Matuška, Zdenek Motyčka, Zdeněk Motyčka *2016*
Surveyed by: Štěpán Mátl, Zdenek Motyčka, Jiří Buček, Zdeněk Motyčka *2016*
Drawn by: Štěpán Mátl *2016*

Fig. 4 A map of the Diao Dong Cave, Shaanxi, China

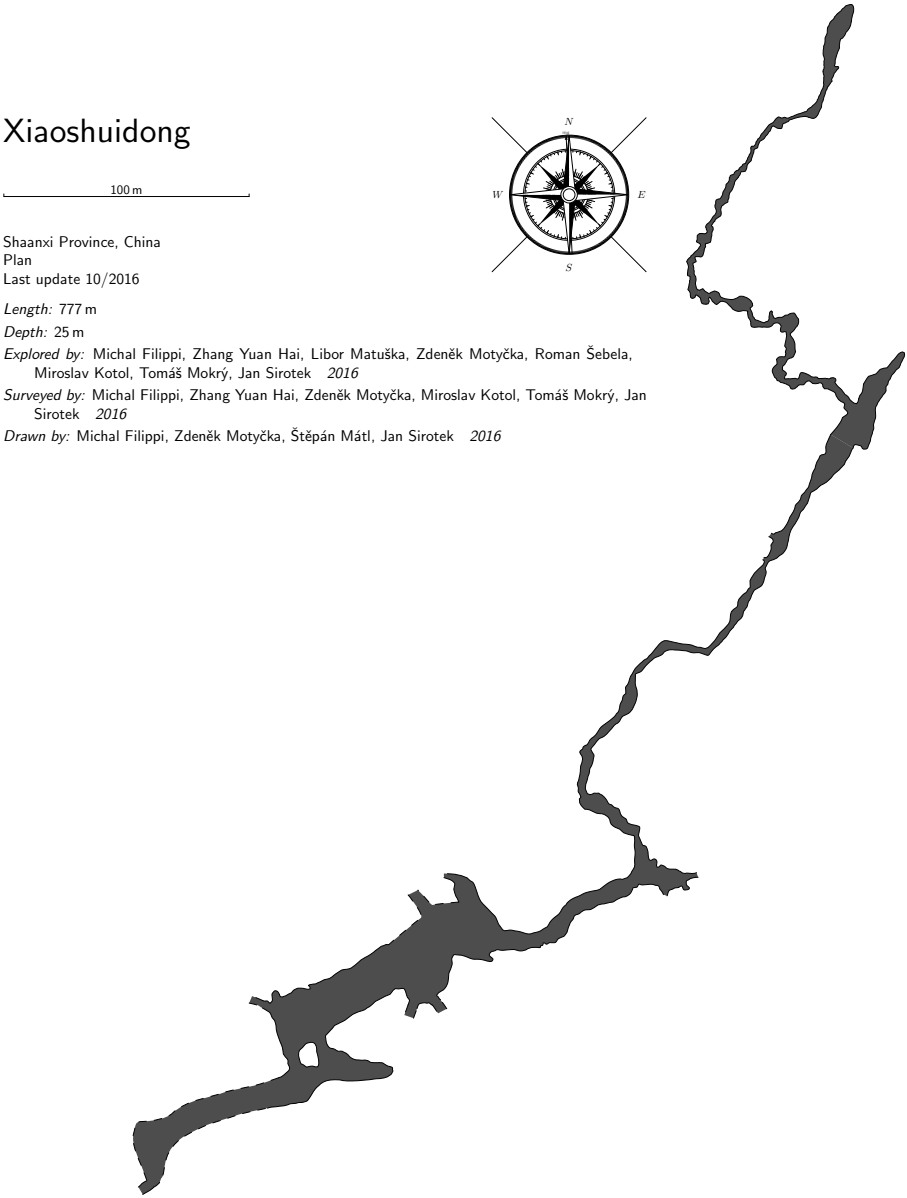


Fig. 5 A map of the Xiaoshuidong Cave, Shaanxi, China

During both expeditions, several large dolines (tiankengs) and promising caves were discovered and their survey was successfully started. The main speleological discoveries are listed below:

Boniukeng Cave (length: 1,386 m; depth: –186 m)
This cave starts at the bottom of a large collapse doline of 80 × 50 m in size and 80 m in depth. A relatively large passage continues in both directions, down the underground stream (lower part with passages 2–20 m high and 2–5 m wide) and upstream (upper part with passages 2–30 m high and 2–5 m wide). The lower part is technically difficult with small but deep lakes and steep steps up to 17 m in height. The passage continues towards an unknown cave space. The upper part is represented by a passage (later branching) of a decreasing size from 15 × 30 m to 1 × 8 m (width × height). Several chimneys up to 70 m high were found there. A fossil level with artefacts was found in this part of the cave (fig. 1, photo 1).

Guanyindong Cave (length: 3,024 m; depth: –445 m)
The cave starts with an inconspicuous entrance portal (10 × 4 m in size) at the bottom of an elongated doline densely covered by vegetation. A gently descending and meandering passage with a stream and small steps continues for the next approximately 300 m. The stream is dotted by some other tributaries. Then, a relatively large cave space named Birds Hall (25 × 10 m) opens. Approximately 800 m behind the entrance, the passage continues via a 10 m deep step as a huge tunnel (max. 10 m wide and 30 m high). The upper part of the cave as far as the tunnel is named Old Guanyindong while the large spaces below are named New Guanyindong. The tunnel also hosts a stream the upstream part of which ascends significantly and reveals a crossing with collapses to the surface after ca. 100 m. Downstream, the tunnel continues for approximately 500 m but its height decreases (except for two larger spaces). After the next several hundred meters (1.5 km from the crossing with the Old Guanyindong part), the cave ends in a narrow, impassable space. Chert beds protruding from the limestone are a typical feature of this cave (fig. 2).

The Dragon Cave (length 895 m; fig. 3), Cave Resurgence 1 (length 338 m) and the Three Cigars Cave (length 48 m) are other caves discovered and mapped. In total, over 7 km of new cave passages were mapped and photo-documented. After the first expedition, a detailed drone scanning was realized by the Shaanxi Geological Institute in Xi´an in this and adjacent areas, and many new sinkholes were discovered and photo-documented. Exploration in all the above mentioned caves as well as the reconnaissance and study of the new promising locations in the Shaanxi Province will continue in the following years.

Diao Dong Cave (length: 704 m; depth: –45 m)
The Diao Dong Cave is opened via a vertical shaft 18 m deep and 20 × 5 m wide, with a waterfall on its wall. At the bottom, a cave passage (up to 5 × 10 m in size) starts downstream and upstream. The tributary part ends in a small dome and a step with a waterfall (not surveyed). The "main" downstream passage is larger, reaching approximately 15 × 20 m in cross section. After a rock step approximately 20 m deep, the passage changes into a relatively narrow but up to 40 m high space with small cascades. This part was named Turbines because of the characteristic noise of the present waterfalls (fig. 4).

Xiaoxuidong Cave (length: 777 m; depth: –25 m)
The cave portal (40 m in height) is situated at the end of a blind valley close to the Xigou village. A zigzag-shaped horizontal passage of the same height but only 3 to 5 m wide opens to a huge – 100 m long, 20 m wide and 53 m high – cave hall with some windows at its ceiling. The cave then continues through a passage 8 × 15 m in size, which gently decreases and

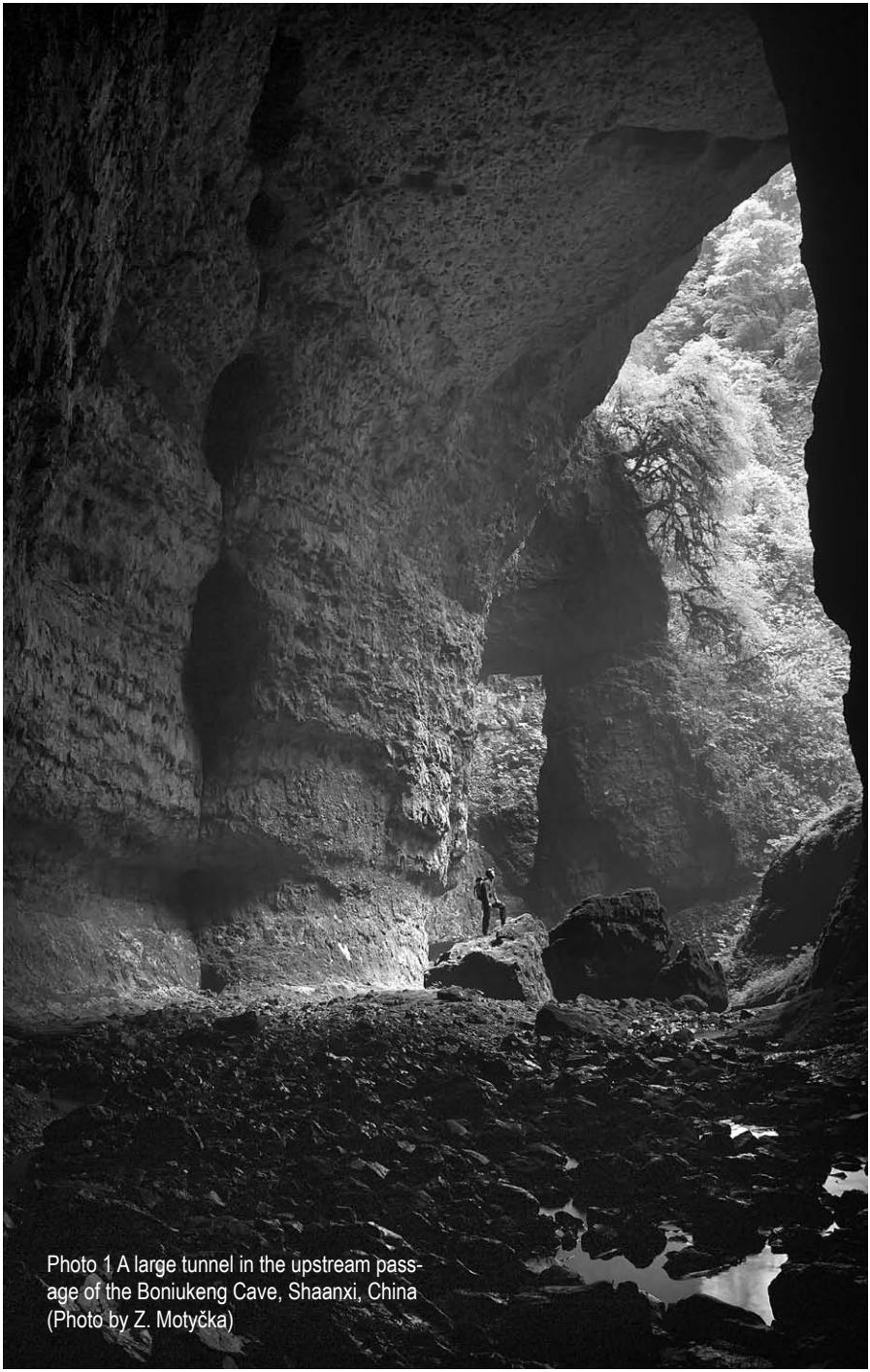


Photo 1 A large tunnel in the upstream passage of the Boniukeng Cave, Shaanxi, China (Photo by Z. Motyčka)

contains two small steps (3.5 m and 2.5 m in height). Another, much smaller hall opens after the next 200 m. Behind this hall, the passage becomes smaller again and a lake fills the whole profile after the next 100 m. The flooded passage continues for the next 120 m and then a small hall with a lake (30 × 6 m in size) opens. The free space of the cave is terminated by a sump behind this lake (fig. 5).

References:
Motyčka Z., Filippi M. (2017): Shaanxi 2016: First Czech traces in China. – *Speleofórum,* 36: 59–69. Praha.

Chatyr Dag Ridge, Crimean Peninsula

Josef Wagner

The Chatyr Dag Ridge hosts the cave system of Emine Bojir Chasar, which also includes the lower system of halls and corridors called Emine Bojir Chasar Nizhni (fig. 1). This system has been subjected to explorations of Czech speleologists since 1981. Members of the Caving Club Orcus Bohumín of the Czech Speleological Society have the exclusive opportunity to conduct research in cave domes filled with calcite and aragonite crystals. From the year 2004 on, the cave was closed. In 2015, a decision was made to open the cave entrance and continue its exploration and documentation. In 2015 and 2016, two expeditions to this cave were organized by the speleologists from Bohumín.

As yet, only very little information is available on the genesis of unique crystal formations filling the cave. Do we ever learn why billions of calcite and aragonite crystals were created by natural processes in this cave only? Druses of hair-thin crystals up to tens of centimetres long. Dripstone colonnades covered with aragonite needles, rich crystalline forms resembling coral reefs, chrysanthemum blossoms, aragonite crystal chandeliers. There are many theories on the origin of such speleothems. All of them are but speculations and hypotheses (photos 1, 2). White acicular crystals are coated with a thin brownish layer of ankeritic dolomite at their ends. This coating suggests that the cave underwent a stage of hydrothermal karstification during its history. Dolomite coatings often occur orientated from one side of the aggregates, as if steams containing hot aerosol were passing through the cave from one direction.

Therefore, one of the aims of the expeditions to the Emine Bojir Chasar Nizhni Cave was sampling of crystals, sediments and waters for further mineralogical analyses and datings. Analyses of the samples are currently being made in the laboratories of the Institute of Geosciences of the Slovak Academy of Sciences.

Detailed explorations of large domes whose ceilings, walls and bottoms are covered with aragonite crystals led to the discovery of groups of strange crystal shapes. These formations were named “crystal stalagmites”. They are as much as 1 m tall and hollow. The crystals seem as if grown over a cone-shaped core, which disappeared later, leaving behind the crystals themselves. Some of them are pure white but most of them are ochre-coloured. This is another discovery, peculiarity and mystery in the Emine Bojir Chasar Nizhni Cave.

The largest space in the cave is the Nokturno Hall 40 m high, 80 m long and 50 m wide. A virtually fabulous place in this hall is a rock terrace densely filled with a forest of stalactites and stalagmites formed by druses of white calcite crystals. Millions of densely packed straw-

Photo 1 Emine Bojir Chasar Nizhni, Crystalline forms in the Crystals Dome
(Photo by J. Wagner)

shaped crystals reach out into all directions from thin stalactite sticks, being covered with transparent acicular and hair-shaped aragonite crystals at their ends. The terminal part of the cave is formed by the "Hall of Red Poppies" (photo 3). While all other cave spaces are white and honey-coloured, full of white crystalline forms, the Hall of Red Poppies shows all hues of red: dripstone formations, crystals and the whole dome. The "Hall of 20th Anniversary of the Simferopol Caving Club" was discovered above this hall; it contains other unique aragonite formations. Flowers of calcite and aragonite crystals grow directly from a lake lined by flowstone dams. The lake surface seems to be covered by floating crystal aggregates resembling water lilies. Snow-white and honey-coloured stalactites with roses of calcite needles plunge into the lake from above. Walls of the dome are covered with intricate clusters of helictites of all shapes and colours, fabulous aragonite and calcite speleothems, indeed.
One of the goals of the expeditions was to shoot a film about this cave and to continue in the prolongation of cave endpoints. A continuation of the cave, called "The Aquatic World", was discovered after artificial draining of flooded spaces (Wagner 2017).

References:
Wagner J. (2016): Čatyr Dag 2015 Expedition. – *Speleofórum*, 35: 78–81. Praha.
Wagner J. (2017): Emine Bojir Chasar 2016 Expedition, May 21–29, 2016. – *Speleofórum*, 36: 53–55. Praha.

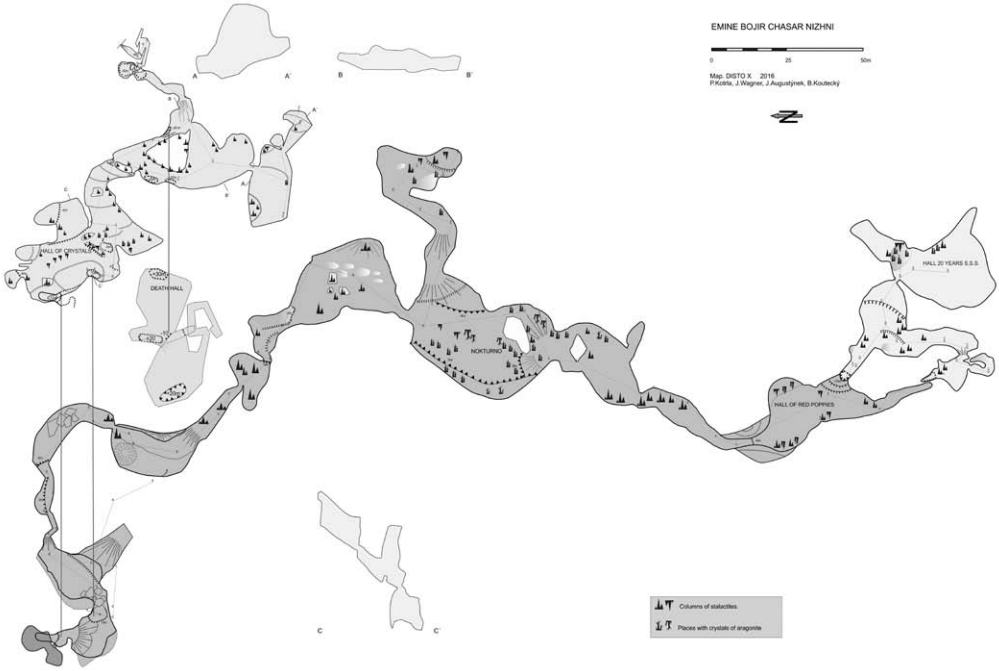


Fig. 1 Emine Bojir Chasar Nizhni

Photo 2 Emine Bojir Chasar Nizhni, Aragonite crystals in the Hall of the KSS 20th Anniversary (Photo by J. Wagner)

Photo 3 Emine Bojir Chasar Nizhni, Hall of Red Poppies (Photo by J. Wagner)

New exploration in underwater cave systems in Riviera Maya, Mexico in 2014–2016

Zdeněk Motyčka, Daniel Hutňan

During speleological expeditions in 2014, 2015 and 2016, members of the Czech and Slovak Speleological Society continued their project on the exploration and documentation of underwater cave systems on the Yucatan Peninsula, which has been running since 2003. The area of interest is located in the Mexican state of Quintana Roo, N from the city of Tulum, near the village of Akumal. They discovered new cenotes to the NW and SW from the known parts of the K'oox Baal Cave system, which is now the third longest underwater cave in the world. Another new area located about 4 km NE of the K'oox Baal Cave system was explored and

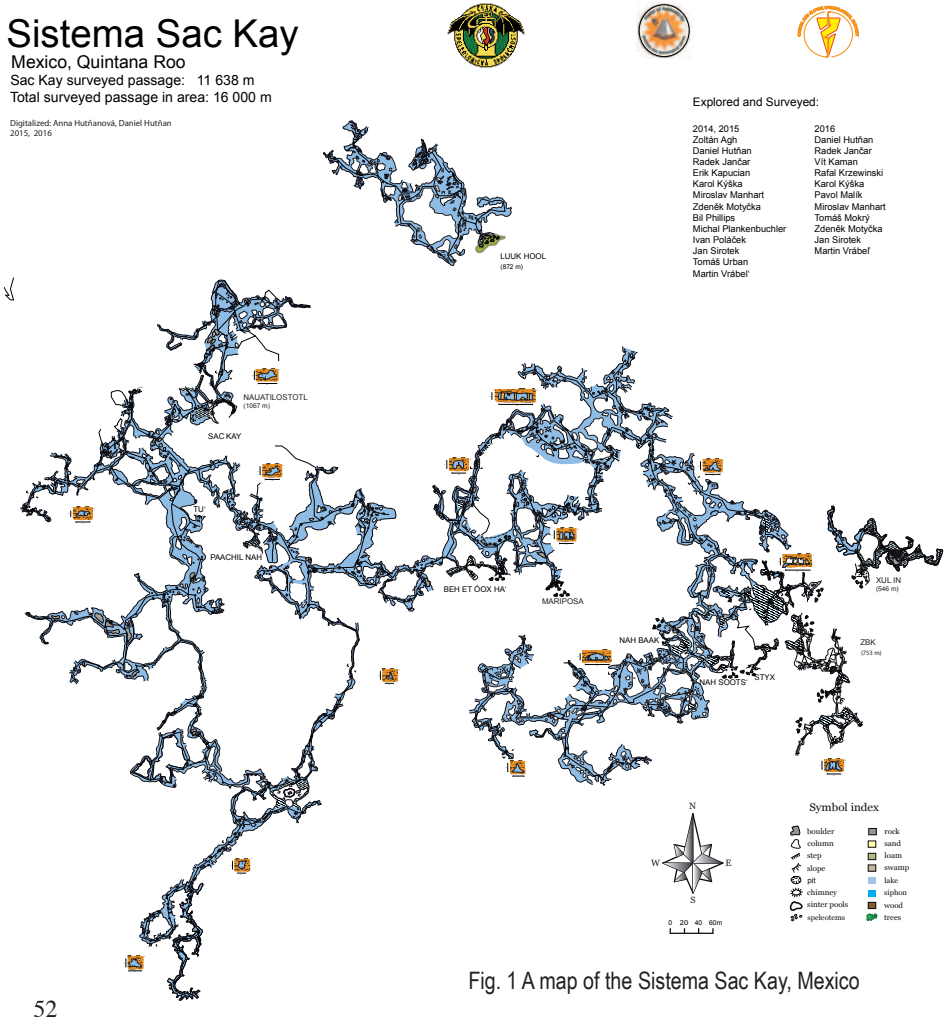


Fig. 1 A map of the Sistema Sac Kay, Mexico

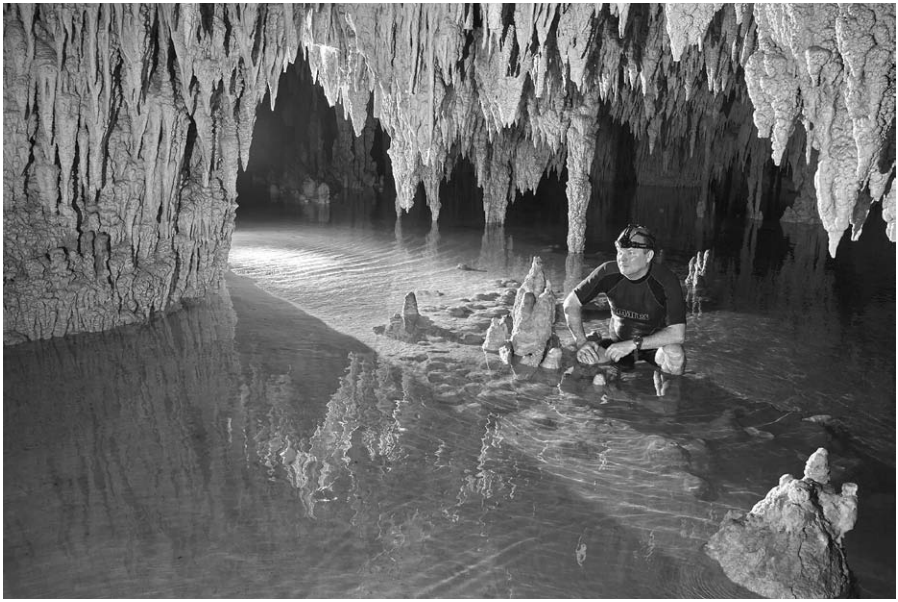


Photo 1 A flowstone-decorated passage in the Sac Kay cave system, Mexico
(Photo by Z. Motyčka)

many new cenotes were discovered there. The following people participated: Daniel Hutňan, Radek Jančar, Vít Kaman, Karol Kyška, Rafal Krzewinski, Miroslav Manhart, Pavol Malik, Tomaš Mokrý, Zdeněk Motyčka, Jan Sirotek, Martin Vacek and Martin Vrábel.
During 14 days in February 2014, they discovered two new cenotes to the NW and SW from the known parts of the K´oox Baal Cave system. They discovered 589 m of new passages in the new cenote of Shoot's Hool and 1,176 m of new corridors in total in the cenote of Wa Ba'ax Yan. During an inspection dive in the Chak Ha cenote, they discovered 354 m of new passages and connected Chak Ha with the Zebra cenote (discovered in 2015), which reached the total length of 2,443 m. The main result of this expedition was the reconnaissance of new area, located about 4 km NE of the K´oox Baal. They discovered 8 new cenotes with 2 km of new corridors with a potential for their continuation and connection to a larger system.
In February 2015, project members focused their exploration on new cenotes discovered in 2014, located about 4 km NE of the K'oox Baal Cave system. In two weeks they discovered 3.2 kilometers of new corridors and connected four of these cenotes –Tu cenote, Nautilostotl cenote, Paachil Nah cenote and Beh et Óox Ha cenote – into one system with a total length of 5,271 m. Two more cenotes were separately explored in the area. First of them – Ash Puk cenote – is 650 m long, and the second one named Carita is 350 m long.
In January and February 2016, three groups of cavers continued the project for exploration of underwater cave systems on the Yucatan Peninsula. During 5 weeks they discovered new underwater tunnels in the Nah Baak cenote and also in the new Mariposa cenote. Altogether they discovered 5 km of new passages and connected most cenotes in the area to one system called Sac Kay. The total lenght of the system is now 11,638 m (fig. 1, photo 1). New corri-

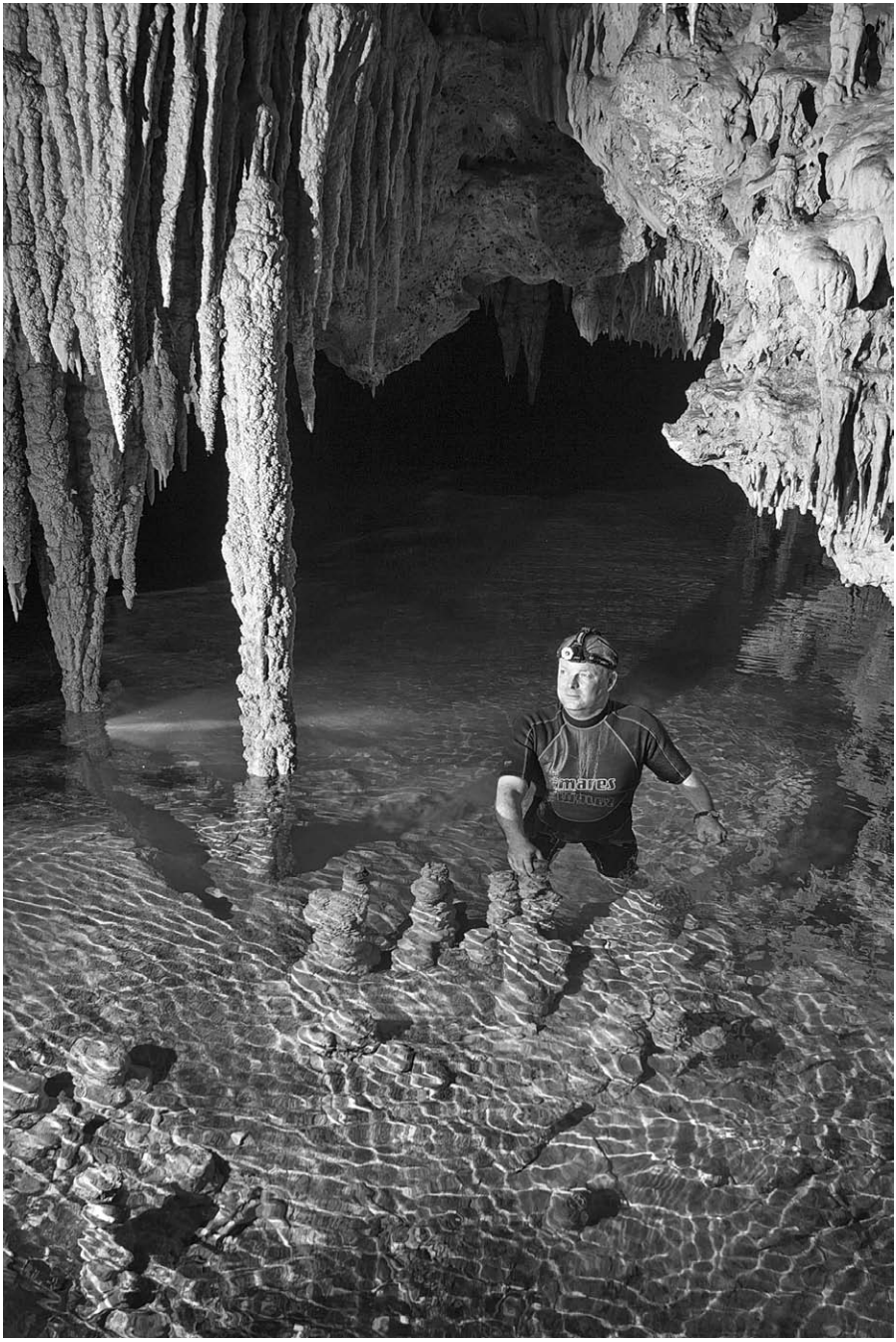


Photo 2 A side corridor in the Xul In cenote, Mexico (Photo by Z. Motyčka)

dors were also discovered in the Luuk Hool cenote, which is now 872 m long. A surprise was the discovery of two new dry caves – Xul In, 546 m long (photo 2) and ZBK, which is 753 m long. In the last days of the expedition the team also surveyed and mapped new passages in the K´oox Baal Cave system. This was explored by the team of Czech and Slovak speleologists from 2006 to 2012, and is now 90 km long and is actually the third longest underwater cave in the world. The hitherto published results are summarized in the References.

References:

Journal Papers:
Motycka Z. (2004): Phenomenon of underwater caves of Riviera Maya, Mexico. – 3rd NSK. Brno.
Motyčka Z. (2007): Xibalba 2006 – nearly 10 kilometres of new discoveries! – *Speleofórum*, 26: 34–38. Praha.
Motyčka Z. (2008): Xibalba 2007 – the discovery of the 7th longest underwater cave in the World! – *Speleofórum*, 27: 57–59. Praha.
Motyčka Z. (2009): Xibalba 2008 – the discovery of teh skeleton of new animal species. – *Speleofórum*, 28: 60–62. Praha.
Hutňan D. (2010): Mexico – Following the footsteps of mastodont. – *Speleofórum*, 29: 59–63. Praha.
Motyčka Z., Hutňan D. (2011): Xibalba 2010 – K'oox Baal Cave System is 30 km long. – *Speleofórum*, 30: 50–52. Praha.
Motyčka Z., Hutňan D. (2013): Xibalba 2012 – K´oox Baal is more than 70 km long. – *Speleofórum*, 32: 57–59. Brno.
Motyčka Z., Hutňan D. (2015): Xibalba 2014 – new challenges! – *Speleofórum*, 34: 50–52. Praha.
Motyčka Z., Hutňan D. (2016): Xibalba 2015 – beyond the gate of dreams. – *Speleofórum*, 35: 70–72. Praha.
Motyčka Z., Hutňan D. (2017): Xibalba 2016 – Sac Kay and third longest underwater cave in the world. – *Speleofórum*, 36: 51–52. Praha.

Monographs:
Motycka Z. et al. (2013): *A Quest for the secrets of Xibalba*. – Brno, Czech Republic.

Conference proceedings papers:
Motycka Z. (2009): New Discoveries in underwater cave systems in Riviera Maya, Mexico. – *Proceeding of 15th ICS. Kerville*, USA.
Motycka Z. (2013): K´oox Baal – 4th longest underwater cave system in the world. – *Proceedings of 16th ICS, Volume 2: 130–133. Brno, Czech Republic*.

Tepui – Akopán Expedition, Venezuela

Marek Audy

History of the expeditions of the Czech Speleological Society members to table mountains of the Guiana Highlands in Venezuela commenced in 2002 on the table mountain of Roraima. The cave of Ojos de Cristal was discovered by a mixed Czech and Slovak expedition (Audy, Šmída, 2003). In 2006, the Ojos de Cristal Cave was prolonged to 8.2 km, which ranked it the longest sandstone cave in the world.

In 2004, our interest was extended to the vast Chimantá Massif. The international team of Czechs and Slovaks was supplemented by scientists and speleologists from Venezuela, USA, Canada and Croatia. The cave of Cueva Brewer was discovered under the leadership of Charles Brewer Carías (Brewer, Audy 2009). Two other caves, Colibrí and Muchimuk, were merged with the Cueva Brewer Cave in 2009. That year, the total length of the system of 17.8 km was documented, which placed the Sistema Brewer to the first position in the world list of the longest sandstone caves.

In 2015, members of the Czech and Slovak Speleological Societies explored caves and abysses in the northern part of Akopán Table Mountain in the Chimantá Massif.

Akopán Table Mountain was named by Indians of the Pemon tribe after the prominent landmark of a rock pillar topped by a round stone. This giant monolith reminds the local people of the "ako" stone used for manioc crushing in the preparation of cassava bread. The suffix of "pán" refers to a "mountain" in the Taurepan language.

The first scientifically orientated expedition to Akopán Mountain was realized by the Venezuelans in early 1984. Besides the description of endemic plants and animals, the expedition was studying geology in much detail. Thick accumulations of volcanic intrusions are exposed in the northern part of Akopán (Huber 1992). Along with the intrusions on the near Amurí Table Mountain, these intrusions initiated the hypothesis of the origin of embryonic drainage channels of huge cave systems on the near Churí Tepui (Audy, Kalenda 2010).

The first speleological expedition to Akopán was undertaken by Spanish cavers from Grupo Espeleológico Alavés a Unión de Espeleólogos Vascos in February 1993. Members of the expedition descended into several grietas (tectonic crevasses). They marked them by ordinal numbers: Sima Acopán 1, 2, 3, 4, 5. The expedition also explored the huge abri on the southern side of the mountain (Lz de Ipiña J. M. 1994).

In 1995 after a careful reconnaissance from a helicopter, a Japanese climber expedition has a trail cleared by the Pemons from the Yunek community to the table plateau of Akopán. During less than two weeks, the indigenous people managed to clear the trail as far as to the confluence of Río Yunek coming from Akopán and Río Sajoco sourced from the underground spring of the Sistema Charles Brewer from Churí Tepui, which was discovered not earlier than in 2004. This opened the possibility to visit the most extensive table plateau of the Chimantá Massif on foot. This advantage was, however, taken by only a few touristically or botanically orientated expeditions.

In 2013, the Czech expedition consisting of six cavers and botanists challenged the trail marked by the Japanese. Before our first ascent, we performed airborne stereoscopic photographing of the northwestern part of the mountain. The photos, however, found their use not sooner than after two years. Unfortunately, one of the expedition members seriously injured his eye the next day, and the speleological team had to retreat.

Also the beginning of our next Akopán expedition in 2015 was marked by a fatal aviation accident. An experienced pilot and a direct participant of several preceding expeditions O. Colson crashed with his plane during the transport of expedition members and material to the Pemon

village of Yunek. Despite of immediately provided first aid, he died of his serious injuries.
The 2015 expedition, consisting of Czech and Slovak scientists of various specializations, hired 12 Pemon porters at Yunek and managed to reach the base camp on the Akopán summit plateau.
The area appointed for exploration included two active ponors of surface rivers and several abysses.
The very next day, we discovered a relatively large cave of Cueva Monika on the bottom of a 80 m deep abyss. The bottom of the abyss, covered with jungle, opens into two caves. The westerly one follows the principal tectonic fractures and terminates in a very narrow vertical joint with a small stream.
The second subhorizontal corridor with a prominent draught was found at the base of a notable talus cone. The corridor descends in a step-wise manner and hosts a river with a discharge of 1 m^3/s at a depth of 220 m. The river disappears in a low, sandy sump. The overall length of the cave is 1.2 km.
Four days later, we resolved to explore a giant, almost 1 km long tectonic crevasse. Previously it was studied by Spanish cavers in 1993 and was named Sima Acopán 1 (photo 1). The Spanish cavers reported the main drainage of the whole huge grieta only in the east. Based on our findings, however, only the so-called Eastern River (Río Oriente) leaves the area in the east.
Our expedition explored the western part of this huge abyss. At its bottom, we discovered a cave almost 1 km in length, hosting the Western River (Río Oeste). This second river can be traced under the ground in upstream direction to the south. Its ponors were previously photographed from the air by our expedition (fig. 1).
The Akopán 2015 Expedition also yielded interesting geological information. Large underground systems, similar to those from the Churí Tepui only three kilometres away, were expected by the speleologists. This optimistic vision did not come true. Anyway, valuable data for the

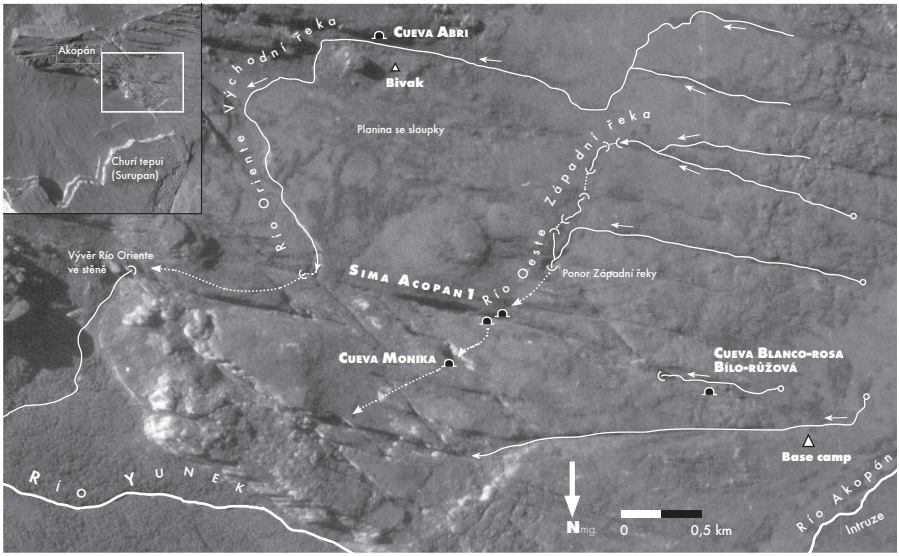


Fig 1 Hydrology of the northern part of Akopán Mountain with indicated karst phenomena under study (Compiled by M Audy)

specification of genesis of sandstone caves were obtained by geologists during the expedition. Horizontal sandstone caves are formed only along specific geological strata. One of the essential properties of these strata is their impermeability (Audy M. & Kalenda P. 2010). The scientific team of the expedition explained the origin of this impermeability by the so-called lithification. Lithification of the Matawí Formation took place at times when the whole Roraima Formation was covered with sediments rich in feldspar, clay and mica. These sediments were then subjected to lateritization in shallow lakes – a process which introduced encrusting SiO_2-rich fluids in the underlying strata. It resulted in inhomogeneous lithification of only some of the strata. The areally most strongly hardened bed in the western Akopán is represented by the today's upper surface of the mountain (1800 to 1900 m a. s. l.). In the geological past, caves were formed in loose sand and soft sandstone. This corresponds with caves located at higher elevations (+300 m) on neighbouring Churí Tepuis. These overlying strata have been already eroded from the western Akopán, leaving behind nothing but thousands of columns and pillars lithified by the so-called "finger-flow" of SiO_2-rich fluids (Aubrecht et al. 2012). The process of saturation of sand by encrusting SiO_2-rich fluids can equally explain the origin of the tepui themselves. The lower unit (Gran Sabana) is lithified to a much lower degree or shows no signs of lithification at all. Until these days, the lower-positioned soft, unlithified strata are still being undercut by surface streams. The only resisting elevations are tepui loaded by gigantic caprocks of the overlying lithified strata. This corresponds with the theory of a feedback between static loading and erosion in sandstones (Bruthans et al. 2014).

Photo 1 Sima Acopán 1 in the southern part of Akopán Mountain described by the Spanish expedition in 1993 (Photo by M Audy)

References:
Aubrecht, R., Barrio-Amoros, C., Breure, A., Brewer-Carías, Ch., Derka, T., Fuentes-Ramos, O.A., Gregor, M., Kodada, J., Kováčik, Ľ., Lánczos, T., Lee, N.M., Liščák, P., Schlögl, J., Šmída, B. & Vlček, L. (2012): Venezuelan tepuis – their caves and biota. *Acta Geologica Slovaca* (Bratislava).
ISBN 978-80-223-3349-8, 1-168.
Audy M., Šmída B. (2003): Crystal eyes (Czech–Slovak expedition to quartzite karst of Venezuelan Guiana). – *Speleofórum*, 22: 60–63. Praha.
Brewer C. Ch., Audy M. (2009): *Entrañas del mundo perdido*. – 1–291. Caracas.
Bruthans J. et al. (2014): Sandstone landforms shaped by negative feedback between stress and erosion. – *Nature Geoscience*,7,597–601 doi:10.1038/ngeo2209
Huber O. (1992): *Chimantá Escudo de Guayana, Venezuela*. – 1–343. Oscar Todtmann Editores c. a. Caracas..
Lz de Ipiña J. M. (1994): Cavidades estudiadas en la expedicion al Macizo Chimantá 1993. – *Boletin de la Sociedad Venezolana de Espeleología,* 28: 34–51. Caracas.

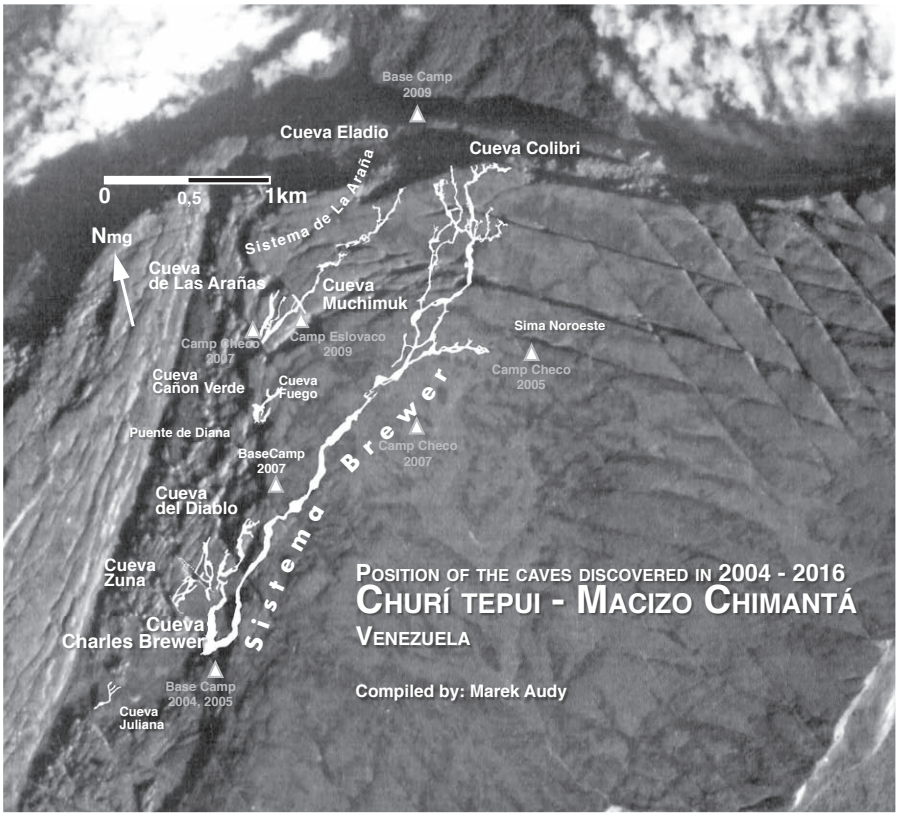


Fig. 2 Position of the caves discovered in 2004–2016

Czech–Georgian co-operation in exploration and documentation of caves in the Racha and Imereti area (Georgia)

Vratislav Ouhrabka et al.

With the Racha 2016 Expedition, cavers of the Caving Club Bozkov of the CSS continued their activities in Georgia, provided within the development aid under the auspices of the Cave Administration of the Czech Republic since 2012. Experts of the Cave Administration CR participated in projects run by the Czech Development Agency in Georgia: "Strengthening management effectiveness in the Imereti Cave Protected Area (ICPAs)" and "Elaboration of development concept for caves in the area of Imereti, Samergelo and Racha". The karst massif of Racha lies 40 km NE of Kutaisi above the mining town of Tkibuli. The area of interest includes the Nakerali Ridge with the peak of Tskhradzhvari (1570 m a.s. l.) and the complex plateau of Vakenadzvnari in its continuation. The plateau covers the area of 60 km^2 with the mean altitude of ca. 1500 m. The area is formed by Cretaceous carbonate rocks, especially by shallow-water limestones of the Urgon facies and ammonite limestones.

The karst phenomena (caves) known to this date are developed in the uppermost (1400–1500 m a. s. l.) portions of the plateau, it its southern, relatively easily accessible part. This is also the level of outflow sumps of the known subterranean streams and flood resurgences on the bottoms of sinkholes and valley depressions. Further drainage towards the base level is uncertain. The plateau is dissected by many valleys and deep sinkholes, covered by hardly passable forests with a dense undergrowth of rhododendrons. Any movement on its top and exploration of more distant parts are very difficult. Exploration and documentation of the Muradi Cave were completed during the expedition. The main parts of the cave were discovered in 2015, when a corridor 600 m long was surveyed. New exploration focused on three abysses in the terminal part of the corridor; these abysses open to the active level formed by narrow meanders ca. 200 m long. In addition to rich classical flowstone decorations in the

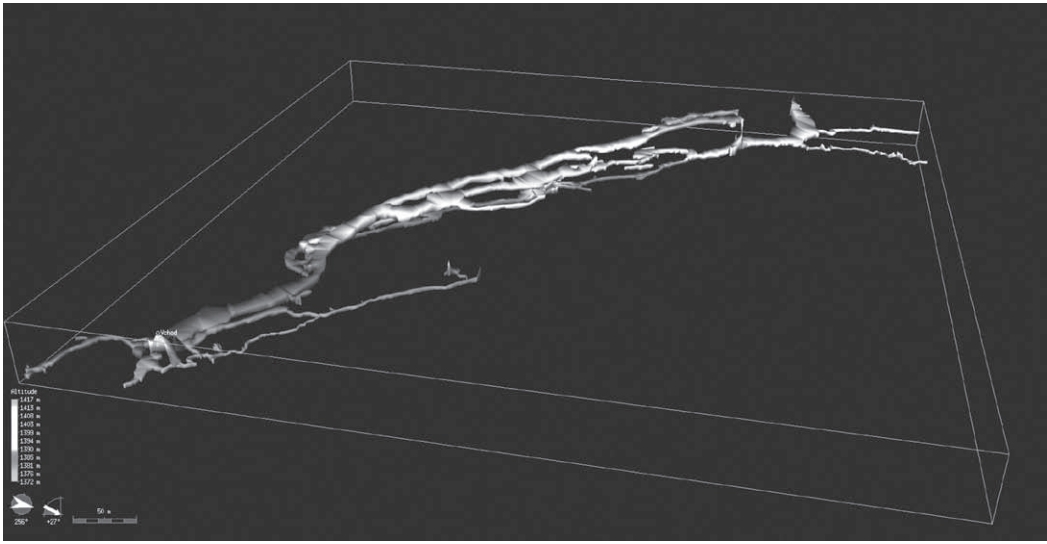


Fig. 1 3D model of the Racha 2001 Cave (Image by V. Ouhrabka)

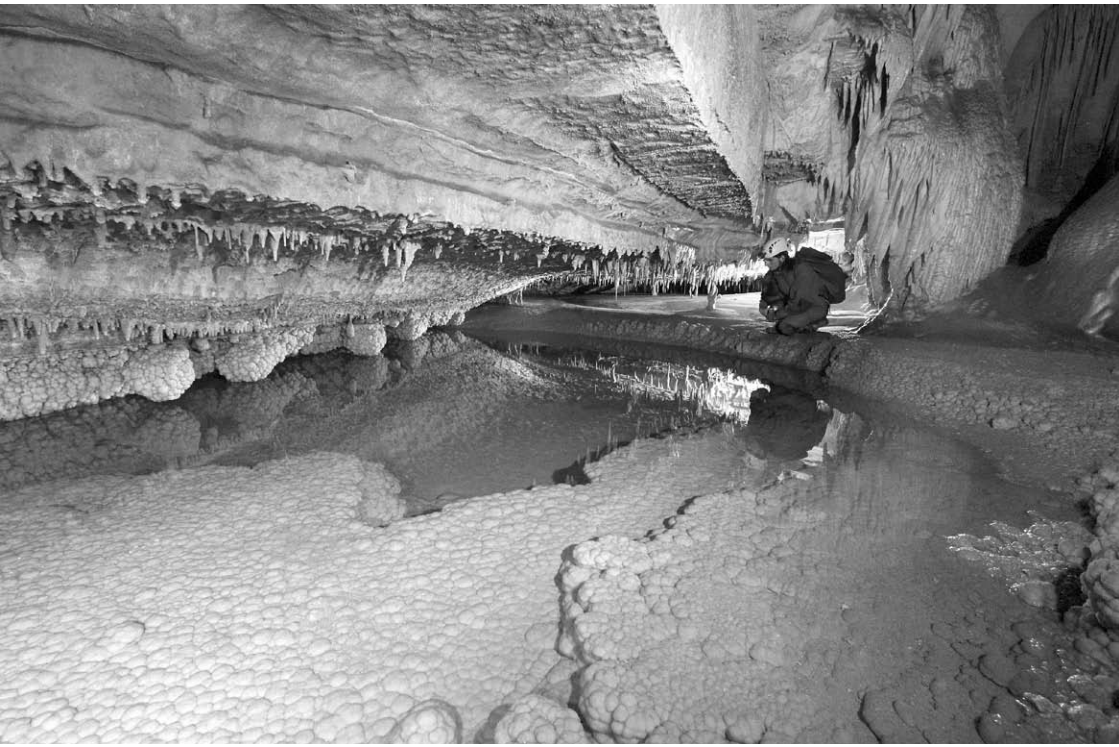


Photo 1 Unique decorations in the Muradi Cave (Photo by V. Barbagadze)

Muradi Cave, the central part of the main corridor features unique spherical crystalline formations max. 30 cm in diameter, growing at the ends of stalactites extending under the original level of the flowstone lakes (photo 1).

The second documented cave is "Racha 2001" (fig. 1, photo 2). It is located in northern slopes of a sort of a central valley elongated E–W in the southern part of the "Racha massif". The cave consists of corridors over 3 km in length, developed at three main levels. The lowermost level hosts a stream all along its length. The outflow sump undoubtedly communicates with open, water-filled channels on the bottoms of sinkholes in the vicinity of cave entrance. Further on, the Medvědí Cave and the Tskhradzhvari III Cave were explored, lying in the marginal walls of the Nakerali Ridge. The final stage of the expedition was dedicated to documentation of the Melouri Cave, which is one of the ponor caves of the so-called Tskaltubo cave system (Sataplia-Tskaltubo karst area). This system consists of a whole set of ponor and paleoponor caves (Satsurblia, Slokota, Didghele, Melouri, Bgheri…), which drain water through as yet unknown paths to the resurgence caves in the lower part of the Kumistavi village (Orpiri, Opicho, Ghliana, Kumi …). The length of all underground spaces in the whole system is presumed by the Georgian speleologists to reach several tens of kilometres.

The expedition surveyed 5,527 m of corridors and took more than 500 documentation photos from six caves. The obtained map and photographic documentation should become a solid basis for a new documentation archive of the Georgian caving club.

References:
Ouhrabka V. (2017): Racha 2016 Expedition: the Bozkov caving club among rhododendron shrubs. – *Speleofórum*, 36: 55–59. Praha.

Photo 2 Canyon-like corridors of the lowermost level of the Racha 2001 Cave host an active stream (Photo by S. Řehák)

Taurus Expeditions to the Altinbesik Cave (Turkey) in years 2013–2016

Evžen Janoušek

In the years 2013–2016, four expeditions Taurus were organized by Caving Club Geospeleos to the Turkish Altinbesik Cave (photo 1) and its vicinity.
The Altinbesik Cave lies 150 km to the north of Antalya, near the town of Ibradi. The starting point to the cave is the village of Ürünlü. The vicinity of the cave was proclaimed a national park (Altinbesik Cave National Park) and its entrance tract was opened to the public in 2011. The cave drains an extensive area of the western Taurus Mts. in the counties of Ibradi, Derebucak and probably also Manavgat. As has been proved by a dye test, the Altinbesik Cave is interconnected with the ponor cave of Büyük Düden on the Kembos Polje near Derebucak. The straight distance between the caves is 31 km. The Taurus expeditions are an international project under co-operation of the CSS members and cavers from the Turkish clubs of Aspeg, Bumad, Obruk and Ütümak. During the last expedition, Czech cavers were also supported by geologists from Mugla University and Istanbul University.

Taurus 2013 Expedition
This expedition was the first joint expedition with Turkish cavers after a long break lasting from the year 1997. A part of the cave was surveyed between the first sump and the Nesvik Sump. The main polygon behind the sump has a length of 2,106 m and an altitude difference of 122 m. In front of the first sump, a side corridor with the Sedmnáctka (Seventeen) Abyss was discovered, having the total length of 64 m and an altitude difference of 16 m. A television documentary was shot during the course of the expedition; it was broadcasted in the Objektiv series of the Czech TV, channel ČT1, in the same year. Photographic documentation was taken of the part of the cave lying ahead of the first sump.

Taurus 2014 Expedition
Due to the extremely high water levels in the whole cave, exploratory works behind the sump were not continued. Instead, the activities concentrated on the part lying ahead of the sump. A new polygon was surveyed from the entrance along the main corridor to obtain a link to the coordinates of our discoveries behind the sump.
Six stops of a virtual tour through the cave were photographed. Photographic documentation of the fossil tract of the cave (Galerie) above the entrance lake was taken.
All cave entrances on the opposite slope of the Manavgat River valley were explored and surveyed. An abyss was discovered near the village of Cukurviran Cami. It has the character of a simple bell-shaped shaft 80 m deep.

Taurus 2015 Expedition
During the expedition, a bivouac was established behind the first sump. It consecutively hosted eight Czech and Turkish cave divers. Another sump, 2 m deep and 15 m long, was passed through in the Lake of Chance in the terminal part of the cave. The newly discovered spaces behind the sump were surveyed in a total length of 350 m. The Nesvik Sump could not be passed through; the maximum achieved depth in a steeply descending corridor was 35 m.
The virtual tour of the entrance tract of the cave and the Galerie area was completed.
A dry ponor near the village of Ormana, several tens of metres long, was explored.

Taurus 2016 Expedition

In the Altinbesik Cave, the team managed to pass through the last cave-in, discovered the largest dome (Geospeleos Dome) and 274 metres of corridors terminated by a sump (Temucin Aygen Sump). Penetration through the sump ended after 100 m at a depth of 15 m with a prospect of further continuation.

A continuation of the corridor near the Sedmnáctka Abyss was found. Two other small passages were found, extending from the main corridor between Lakes 4 and 5 and clearly communicating with each other.

Sediment and water samples were acquired for Turkish colleagues.

An interconnection of the terminal parts of the cave with the surface was subjected to a radiolocation test with a negative result.

The search for the radiotest signal on the surface brought about a discovery of promising abysses (Soví Abyss, Soví Sinkhole Series) directly above the terminal portion of the Altinbesik Cave. Extremely low water levels in the Manavgat River permitted to search the whole channel upstream of the cave as far as to the road bridge. Two dry potential resurgences from the cave were found. One of them (Pepův Resurgence) was 200 m long and ended with a sump.

In a wider vicinity, the Düdenli Bagit Abyss (–56 m) and the Handos Cave were localized and explored. The latter is suitable for cave diving exploration in the future.

A short, sediment-filled dry ponor with an advance retention basin were found near the town of Ibradi. The ponor lies in a direct continuation of the Altinbesik Cave axis.

Results of the expeditions

Basic cave diving exploration was performed in the part of the cave lying behind the first sump.

A synoptic map of all known parts of the cave was completed. The overall length of newly discovered spaces behind the first sump is 2,858 m. A high-quality photographic documentation was taken including the unique virtual tour of the cave. A wider vicinity of the cave was explored with respect to karst phenomena potentially interconnected with the cave system of Altinbesik – Büyük Düden.

Thirty-seven speleologists participated in the expeditions.

Detailed reports, virtual tours, photographs, maps and GPS coordinates of caves discovered during the expeditions are available at www.geospeleos.com.

A continuation of the book "Altinbesik – Journeys to the Golden Cradle" is under preparation.

References:

Janoušek E., Jäger O. (2013): *Cesty ke Zlaté kolébce*. – 1–150. čj -aj. (Journeys to the Golden Cradle), shrnující publikace. ISBN: 978-80-87857- 14-4.

Rusek M., Janoušek E. (2015): Zlatá kolébka v Tureckých horách. – *Lidé a Země:* 8/2015: 64–72. Mladá fronta a.s.

Janoušek E., Dufek O. (2016): Posedlost Zlatou kolébkou. – *Speleofórum,* 35: 73–76. Praha.

Janoušek E. (2017): Posedlost Zlatou kolébkou pokračuje. – *Speleofórum,* 36: 74-75. Praha.

http://www.ceskatelevize.cz/porady/1096902795-studio-6/217411010100127/video/518963

http://www.ceskatelevize.cz/porady/11133443017-objektiv-svet-v-pohybu/215411033160008/

http://www.ceskatelevize.cz/ivysilani/10116288835-z-metropole/216411058230011

http://www.ceskatelevize.cz/ivysilani/1096911352-objektiv/212411030400205/

Photo 1 Altinbesik Cave – the main corridor. (Photo by E. Janoušek)

Photo 2 Cave divers upon submersion into the first sump (Photo by E. Janoušek)

Title: Czech Speleological Society 2013–2016
Edited by: Jiřina Novotná and the editorial board of the CSS
English translations: Jiří Adamovič
Layout, typography: Audy
Print: Gill,s.r.o.

ISBN 978-80-87857-23-6
Contacts: Czech Speleological Society,
Na Březince 14, 150 00 Praha 5, Czech Republic
Office e-mail: sekretariat@speleo.cz
Board e-mail: predsednictvo@speleo.cz
Web page: www.speleo.cz

Front cover: Hranice Abyss, M. Guba is guiding the robot towards the Zubatice space
(Photo by Marcin Jamkowski / Adventure Pictures ©)
Back cover: Diao Dong Cave, Shaanxi, China, (Photo by Z. Motyčka)

Shots taken by the robot at a depth of 404 m. The top left photo (frontal camera) clearly shows a "black hole" – the bottom is too far to be seen! The lower photos (left – rear camera, right – lower camera) show tree trunks on a sloping bottom of the abyss (Photo of the screen)

Fig. 3 Examples of various visibility conditions
(Photo by H. Vysoká)

ISBN 978-80-87857-23-6

Czech Speleological Society

2013–2016

Pyjamas Floor of the Drátenická Cave
(Photo by M. Audy)