



**CZECH
SPELEOLOGICAL
SOCIETY
2017 – 2021**



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Dear friends,

you are opening a brochure summarizing the latest activities of the Czech Speleological Society and its members. Although Czechia is a rather small country, caving has a long history there. With 60 caving clubs, the Czech Speleological Society belongs to the most active ones worldwide.

This publication follows a tradition of reports published at the occasion of the past International Congresses of Speleology, which started in 1986. Its content is divided into two main sections. The first describes the activities of our individual caving clubs and organizational units – the Board of the CSS, the Editorial Board or the Cave Rescue Service. The second section contains brief descriptions of the most important discoveries and research achievements at domestic locations, followed by reports on the most important discoveries of Czech speleologists abroad.

If you want to learn more about Czech caving, visit our website speleo.cz or read the annual proceedings *Speleofórum* with English abstracts, which have been published since 1982.

On behalf of the Czech Speleological Society, I wish you good time in the underground world anywhere around the globe.

Jan Lenart

President of the Czech Speleological Society





REPORT ON THE ACTIVITIES OF THE BOARD OF THE CSS

THE BOARD WAS WORKING IN THE FOLLOWING TEAM:

President – Marek Audy

Vice-president – Zdeněk Motyčka

Members: Libor Láník – economist, Filip Doležal, Tomáš Mokřý, Mojmír Závaška, Radim Brom (resigned in 2018), Jan Lenart (since 2018).

The Board contributed to the preparation of the celebration of the 40th Anniversary of the Czech Speleological Society, which took place on 5–6 October 2019.

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.

Principal international activities were pursued by Zdeněk Motyčka – the Vice President of the CSS, who also functioned as a Vice President of the Administration of the International Union of Speleology (UIS) from the year 2017. He attended international speleological conferences Eurospeleo 2018 at Ebensee, Austria, and 3rd Transkarst Conference 2019 at Bohol, Philippines. UIS Bureau meetings were also organized at the occasion of these events. Together with Pavel Bosák they participated in the UIS Bureau meeting in Paris in 2021.

Zdeněk Motyčka has been a member of the Organizing Committee of the International Year of Caves and Karst (IYCK) since 2018 and has been involved in many activities organized within IYCK. Together with Pavel Bosák they participated in the Celebration of the IYCK in the UNESCO Headquarters in Paris on 13 September 2021.

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 Mokřý, Jiřina Novotná and Petr Polák.

Five volumes of the Speleofórum proceedings were published (Volumes 2017, 2018, 2019, 2020, 2021). Furthermore, 6 issues of the printed magazine Speleo were published in 2017–2019. From 2020, the magazine is being published only in its digital form under the name eSpeleo. By the end of 2021, three issues have been published. The Editorial Board was constantly maintaining the operation of webpages of www.speleo.cz.

REPORTS OF THE ORGANIZATIONAL UNITS

COMMISSION FOR SPELEALPINISM AND RELATED ACTIVITIES (TC)

Composition of the TC:

Chairman: Josef Wagner

Members: Bohuslav Koutecký, Jakub Wagner, Jiří Antonín, Jiří Augustýnek, Mojmír Závíška, Ondřej Belica, Pavel Tásler

The Commission met once or twice a year, as necessary, in order to discuss and coordinate the tasks of its main and secondary objectives. In the period of 2017–2021, these were:

1. Close cooperation with the CRAA
TC members are also founding members of the CRAA – Czech Rope Access Association and perform many activities simultaneously under the auspices of both TC and CRAA.
2. Providing counselling and consultation to CSS members
TC provided expert advice to CSS members, especially in matters of conflict between speleological activities and the legal liability and bindings of the user instructions of vertical devices.
3. Cooperation with the Czech Agency for Standardization in the creation and processing of technical standards
TC commented translations of Czech technical standards and initiated corrections of some of them (e.g., already published EN 363 Personal fall protection equipment – Personal fall protection systems, or not yet published EN 15567-1 Sports and recreational facilities – Ropes courses – Part 1: Construction and safety requirements, and others).
At the same time, TC created and developed standard ČSN 83 2610 Knots – Terminology.
4. Education of CSS members
TC provided training for rope access instructors. TC organized single-rope technique trainings for individuals from the CSS.
5. Cooperation in case of accident
TC was approached by a member of the CSS with a request for cooperation in the court proceedings of the accident in the Lopač Cave. Although TC managed to find serious misconducts in the entire proceedings and in the expert opinion, at the given stage of the court proceedings it was not possible to take into account the findings of TC.
6. Testing of caving vertical devices
TC members tested new caving vertical devices, especially the rope Static 9.0 m (manufactured by Lanex), a new version of the Stop descender (produced by Petzl), and the chest ascender Chest Up (manufactured by Rock Empire). In the case of Chest Up, the manufacturer took into account the findings of TC and made the proposed adjustments in subsequent series.
7. Research activities
Members of the TC conducted research in several directions. Already published were:
 - Comparison of knots for dynamic strength test (published at: <https://craa.cz/wp-content/uploads/2021/09/comparison-of-knots-for-dynamic-strength-test.pdf>).
 - Influence of damage of the loop on the strength of an alpine butterfly (published at: <https://craa.cz/wp-content/uploads/2021/08/strength-of-damaged-butterfly.pdf>).
 Results of further research will be published in the near future.



8. Creation of technical publications

- ANTONÍN, Jiří and Ondřej BELICA. Overview of legal standards and regulations governing work at heights. Prague: Czech Speleological Society, 2018. ISBN 978-80-87857-32-8.
- BELICA, Ondřej and Josef WAGNER. Terminology of knots: in accordance with ČSN 83 2610. Prague: Czech Speleological Society in cooperation with CRAA - Czech Rope Access Association, 2021. ISBN 978-80-87857-43-4.

9. Processing of brief safety principles for caving activities

TC summarized the Safety Guidelines of CSS and created thirteen-point brief safety principles for caving activities.

PSEUDOKARST COMMISSION

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 is to organize the traditional Klokočky workshop focused mainly on caves in sandstones, but also in crystalline rocks.

One member participated in the organization of the 1st Workshop on Field Survey Methods in Geomorphology under the auspices of the Czech Association of Geomorphologists in 2019.

CAVE DIVING COMMISSION

Since 2015, the Commission has been working in the following team: Libor Čech (Chairman), David Čani, Michal Guba, Jiří Hovorka and Lukáš Brychlec, who replaced Ivo Záruba in the Commission.

The Czech Speleological Society includes a number of cave divers who gained their qualifications within various commercial training systems outside the CSS. The Commission offers collaboration to these divers and a completion of a re-qualification course. This should ensure, for activities at sites administered by the ČSS, that they are participated exclusively by divers meeting the requirements of the Safety Code of the CSS, for which they were trained or re-qualified.

The Commission also organizes perfection courses for cave divers actively interested in collaboration with the Commission. For this purpose, annual meetings are organized, where professional instructors present the latest news on diving techniques, organization of events, health issues and on specific activities such as mapping of cave systems.

Besides, the Commission annually organizes extensive drills at various significant localities in collaboration with the Cave Rescue Service. The latest drill was held at the Hranice Abyss, being participated by all components of the Integrated Rescue System: Army of the Czech Republic, Police of the Czech Republic, firemen and medical personnel. In this respect, the Cave Diving Commission contributes to the very good communication and collaboration among the individual components. This is manifested by the regular rises of the professional level of the drills. Modern technical equipment is brought up, including a portable pressure chamber, means of air transportation etc.

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.

The Commission organized two Therion software courses in 2018.

The Commission assisted in organizing the seminar "Accident in the Cave", organized by CSS Cave Rescue Service in 2019.

CSS CAVE RESCUE SERVICE (CSS CRS)

The Czech Speleological Society Cave Rescue Service (CRS) operated in its well-established format during the period under survey: two stations with the total number of 30 cave rescuers – station Bohemia 12 persons and station Moravia 18 persons. The CRS is in direct connection – if rescue is needed – with the team of cave divers trained to conduct rescue operations under water.

The CRS is a segment of the Integrated Rescue System (IRS) of the Czech Republic based on an agreement with the Fire Rescue Service of the Czech Republic.

In the period under survey, over 100 rescue drills of CRS stations were realized, of which 60 were conducted in collaboration with the Fire Rescue Service and other members of the IRS.

The CRS focuses not only on the training of its own rescue teams but also on the risk prevention among CSS members: it organizes regular "Climbing Days" or seminars "Accident in a Cave", helps in the installation of safety elements in frequently visited cave localities and in the establishment of the so-called "rescue points".

Natural climbing simulators of single-rope techniques Chlum komora in the Bohemian Karst and Cave 13C – Hallucination Dome in the Moravian Karst are used for the training of the CRS, components of the IRS and the CSS members themselves.

Rescue operations:

Nová Drátenická Cave, Moravian Karst – 5 March 2017: successful rescue of a caver in a chimney of the shaft-like Nová Drátenická Cave in the Moravian Karst.

Lidomorna Cave, Moravian Karst – 21 July 2018: an injured tourist ca. 50 m from the entrance to the Lidomorna Cave. The victim was transported out from the cave on a stretcher and passed on to the care of the Medical Rescue Service of the South Moravian Region. She was subsequently transported to a hospital by a helicopter.

Ostrovská propast Cave, Moravian Karst – 12 October 2019: a fall from a height of ca. 8 m in the entrance vertical part of the cave. Suspected spinal injury, the victim was transported out from the cave on a stretcher and subsequently passed on to the care of the Medical Rescue Service of the South Moravian Region.

Accident near the Lidomorna Cave, Moravian Karst – 10 January 2021. Assistance of the CRS and Fire Rescue Service at a rescue operation near the portal of the Lidomorna Cave (Holštejn): a help in the transport of an injured individual after a fall from the height. The victim was passed on to the care of the Medical Rescue Service of the South Moravian Region.



In June 2018, the CRS in collaboration with a team of cave divers offered help with the rescue of 13 individuals trapped in the flooded cave of Tham Luang in Thailand. This help was offered through the intermediary of the Ministry of Foreign Affairs CR and the Fire Rescue Service CR but was not taken advantage of.

Regular coordination drill of the two CRS stations:

2017 – Mexiko Quarry in the Bohemian Karst. The drill was aimed at testing routine methods of rescue of victims from underground spaces and at mutual coordination of individual rescue teams combining members of the two CRS stations.

2018 – Amatérská Cave, entrance near Broušek in the Moravian Karst. Coordination with other components of the IRS. Besides cave rescuers of the stations Bohemia and Moravia of the CSS CRS, members of the Fire Rescue Service and Voluntary Firemen Forces squads, the drill was also participated by cave rescuers from Poland and Slovakia.

2019 – a former mine at Zlaté Hory (N Moravia). A drill of rescue operations in historical underground in collaboration with the Fire Rescue Service CR.

2020 – Rudické propadání Cave, Moravian Karst – one of the biggest drills of the IRS components of its kind in the Czech Republic: rescue of individuals using pumping in the underground – a flooded cave, consecutively participated by altogether 120 rescuers of the Fire Rescue Service of the South Moravian Region, CSS CRS, Voluntary Firemen Forces squads and the CSS.

2021 – Javorka Cave, Bohemian Karst – a drill of rescue of an individual from spatially very complicated conditions of a complex cave.

The separate CRS stations are based at equipped stations – storages at strategically significant locations at Tetín in the Bohemian Karst and at Rudice in the Moravian Karst. The facilities are used under prominent support by the local governments of the communities of Rudice and Tetín and their Voluntary Firemen Forces squads.

International activities:

22–24 November 2017: CRS members (2 persons) and members of the Fire Rescue Service of the South Moravian Region (2 persons) participated in a seminar and training organized by the Fire Rescue Service of the Slovak Republic in the Low Tatras, Slovakia.

10–18 November 2018: CRS members (6 persons) together with the Fire Rescue Service (5 persons) participated in professional practical international internship in rescuing individuals from cave complexes, which was held at Lozère, France, and was organized by Speleo Secours Francais FFS.

The CSS CRS was accepted as ECRA Member at the 13th European Meeting of Cave Rescue Services (ECRA) held at Baradine Cave, Istria, Croatia on 13–17 November 2019.

At the ECRA Meeting at Ramales de la Victoria, Alto Asón, Cantabria, Spain in November 2021, also participated by CRS members, organization of the 15th International ECRA Meeting of 2022 at Rudice, Moravian Karst, Czech Republic was agreed.

Information: www.caverescue.cz, www.speleo.cz, Facebook Speleologická záchranná služba (Cave Rescue Service)

LOCAL CAVING CLUBS OF THE CSS IN 2017–2021

The Czech Speleological Society (CSS) comprises 59 Caving Clubs (CC) which include altogether 1,235 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 and other sites in the Czech Republic as well as abroad (Laos, Mexico, Slovenia, Slovakia, Poland etc.).

Caving Club Tetín

The most intensive prolongation activities in the Bohemian Karst were concentrated to caves close to the Tetín village, especially to the caves of Tetínská propáštka No. 2, Terasová, V Řečíně and Mirova. The greatest progress was achieved in the Terasová Cave, the length of which increased from 340 m to 412 m. A new map of the Martina Cave was made; after mapping of all parts, the length of the cave increased from 451 m to 620 m.

In the period of 2017–2021, the Club members discovered and documented 17 new caves 3 to 30 metres long in the Bohemian Karst.

The Club collaborates in the survey and documentation of caves discovered during mining in the Čertovy schody Quarry near the Koněprusy village. In the last four years, there have been discovered nine caves with a length of 4 to 150 m.

Some Club members started a detailed and systematic surface survey of the pseudokarst area of Křivoklátsko.

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.

Some Club members contributed to the study of various karst and mine areas in Israel in cooperation with the Israel Research Centre and The Hebrew University of Jerusalem. In the Slovak Karst, the team cooperated with the Slovak Speleoklub Minotaurus in the Silická Ladnica Cave, the Ponor near Napajedla and other caves on the Silická Plateau as well as in the Krásnohorská vyvieráčka Cave. The Club members joined exploratory and documentation works in the Loferer Schacht cave system, in the Kreuzhöhle Abyss and in the surrounding caves in Austria. They also continued a 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. One expedition to Socotra (Yemen) was organized too.

Forty-four articles about the Club's activities were published in professional press. Some members contributed, as authors or co-authors, to the publication of seven books focused on geological, historical and environmental issues.



Caving Club Zlatý kůň

Activities of the Club were realized at the following sites:

Nová propast Cave – annual bat counting was realized in the cave, a map was completed.

Bonzákova sluj Cave – intensive prolongation works were continued with no major discoveries made

Drdova Cave – the main workplace of the group in 2020–2021, as yet without discoveries of new spaces.

The Club members also contribute to the documentation of pseudokarst phenomena in the Křivoklát area, collaborate in the exploration of sites of other clubs and regularly attend caving events in Slovakia.

Caving Club Geospeleos

Exploration activities took part especially in the caves of Pod Křížem, Stará Aragonitová, Arnika, Vývěr nad klášteřem and Studniční in the Bohemian Karst.

Training and documentary dives were undertaken in the Podtraťová Abyss.

Water level oscillation in cave lakes was registered by sensors with dataloggers in the caves of Čeřinka (2021) and Arnoldka (from 2005). Several virtual guided tours were photographed in these two caves.

Two tracer tests were conducted in the Vývěr nad klášteřem Cave. A tracer test was realized at the Bubovický Creek, which brought surprising results and new questions concerning its catchment. Several radiotests performed at selected localities helped to confirm or exclude further cave continuation.

Cooperation with other organizations continued, e.g., sampling for the project of water quality monitoring (caves Podtraťová, Vývěr nad Klášteřem, Arnoldka, Čeřinka) for the Nature Conservation Agency of the Czech Republic. Also, a cave climate study was conducted in the caves of Čeřinka and Arnoldka (air temperatures, CO₂ concentrations and radon volume activity in the caves were measured), and biospeleological study of invertebrates in the Arnoldka Cave.

Bat monitoring was realized and its results were evaluated annually.

Six members of the club participated in regular trainings of the Cave Rescue Service.

The Club organized the “Petrbok memorial” – annual cavers memorial race of historical bicycles.

The Club members are diligent in publishing, lecturing and organizing excursions in the Bohemian Karst region. Several members are active in publishing scientific papers dealing with, e. g., karst hydrology of the Bohemian Karst, Moravian Karst and Hranice Karst, sedimentology or geophysical measurements.

Members of the Caving Club took part in the following expeditions abroad:

Kačna Jama expeditions, Slovenia (2017–2021), Gouffre Berger, France (2018, 2020), dives in Emergency du Ressel, Source de Landenouse, Résurgence de Cabouy and Trou madame, France (2019), dives in Yucatan, Mexico (2018), Miltitz, Germany (2018), Molnár János, Kóbánya, Hungary (2018).

Caving Club Speleologický klub Praha

The Club focuses its activities to caves in the Na Chlumu Quarry in the Bohemian Karst.

Excavations of The New Collapse, started on the surface in the western part of the quarry, were discontinued in 2017. At a depth of around 15 m, the cavity gets too narrow to provide any prospect for further continuation. The site is still subject to 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 was prolonged for a length of around 25 m. A test pit (Bahnitá sonda) in the Connective Dome disclosed a low, 5 m long, NNE-elongated cavity, branching into two narrow passages extending towards 300°, where a new support structure was built for better safety of this place.

In the year 2016, works started on a test pit above the Vlčí vyhlídka (Wolf Viewpoint) from the surface with the purpose to reach the highest parts of Vlčí vyhlídka in the Netopýří Cave and probably discover the natural entrance to the cave system beneath sediments. In the year 2021, the test pit reached a depth of 13 m and the works are still going on. The works are also coordinated with a paleontologist because the test pit reached a prehistoric river bank.

In summer 2017, Club members built new locks on Cavity II and IV as a protection against illegal paleontological excavations.

In the Srbské Cave, we discovered new parts in the Mud Hall (Bahnitá síň), comprising narrow passages around 35 m in length.

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 on Chlum Hill and Open-Access Day in the Caves at Chlum Hill. The Club also runs and maintains a climbing simulator in the Na Chlumu Quarry, which is an official training centre of cave rescuers.

In the years 2020 and 2021, the activities of the Club were strongly affected by the Covid-19 pandemic.

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

The Club conducts exploration of sites lying in the territory of the Týnčany Karst.

The most important site is the Diviš Cave developed in crystalline limestones of the Sedlčany–Krásná Hora Metamorphic Islet. With the use of hydromining, the Club



members discovered a phreatic passage (Cabicar Passage), which lies well above the present base level, i.e., water level in the cave which hosts most of the as yet discovered spaces of the Diviš Cave. This discovery confirmed multi-stage karstification in this cave system, hence also the possibility of the discovery of new spaces. The discovery of this passage initiated the opening of a new entrance to the cave in the area of "Čtyřicítka" (Forty), which will allow a more effective exploration of this part of the cave. The current total length of the Diviš Cave exceeds 220 m now.

In addition, securing of the Beznadějná (Hopeless) Cave/Dvořák Cave was completed, and a detailed exploration was performed in this smaller cave in the neighbourhood of the Diviš Cave. Reaction sediments (manganese, iron) on the bottom of the cave were studied in detail together with the "sandy" limestone disintegration (inter-grain corrosion).

The Club renders bat counting in the area of the Týnčany Karst and in the Krásná Hora historical ore district.

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 cleaning of Hranice Abyss. Individual Club members practiced other private caving and cave diving activities.

Caving Club Speleoquanaut

Speleoquanaut is a speleological club primarily orientated on cave diving. Our task is detailed mapping of caves and cave systems flooded with water.

In 2020, the Club suffered from a tragic accident of our president Daniel Hutňan. Daniel was the leading personality of the Club, an instructor of cave diving and the mentor of all cave maps published by the Club.

In the period covered by this brochure, we continued the exploration of favourite sites in Slovakia, Sardinia, Romania, Mexico as well as sites in the Czech Republic.

The most notable events of this period include mapping in the Chýnovská Cave, during which data for the 3-D model of flooded portions were provided by members of the Speleoquanaut Club.

Expeditions to the Bue Marino Cave in Sardinia were marked by several achievements: prolongation of the northern branch of the cave by 620 m and passing through the flooded Hasenmayer otazník tract in its southern part. Also, the exploration of a chimney 282 m high, of which 110 m have been ascended using a single-rope technique. A video-recording was taken here using a specifically designed balloon.

In the Su Molente Cave, several joint expeditions with local speleologists took place. The northern part of the cave has been interconnected within the system of the Su Spiria and Su Palu caves. In the south, we strive for an interconnection with some surf caves on the seashore.

The Xibalba Expedition was continued every year from 2017 to 2021, miraculously avoiding the Covid pandemic. We were discovering and mapping cave systems on the Yucatan Peninsula, Mexico: Tatich, Cangrejo, Xul and other independent cenotes,

which have not been interconnected with large systems yet. A major discovery is also the dry cave of Yum Kaxx, which has a length exceeding 10 km now.

The Speleoaquanaut Club collaborates with the Speleodiver Caving Club from Slovakia and with other clubs of the Czech Speleological Society.

Caving Club Barrandien

Sites managed by the Club in the Bohemian Karst include primarily the Nad Kačákem Cave, Na Javorce Cave and the Petzold Cave.

In the Na Javorce Cave, prolongation activities are continued in different parts of the cave. Current depth of the cave is 129 m, which makes it the deepest cave in the Bohemian Karst. Its length of 1,920 m makes it the second longest cave in the Bohemian Karst.

In the Nad Kačákem Cave, exploration of new spaces is under way. Exploratory works were focused mainly on the Sněmovní Dome. In 2020, a new space was found and named the Krtčí Dome. It is 6 m long, 2.5 m wide and 2 m high. Current length of the cave is 457 m.

The Petzold Quarry lies on the left bank of the Berounka River, between the towns of Srbsko and Karlštejn. The Petzold Cave was discovered there in 2008. Since then, the works have been in progress, with the current length of the cave being 840 m.

The Club proceeded in a long-term exploration of the plateau of Dolný vrch – Alsóhegy (Slovakia – Hungary). Almost twenty years of documentary work culminated in the publication of the book Atlas of Karst Phenomena at Dolný vrch in 2019.

Caving Club Chýnovská jeskyňe

The Club participated in the documentation of permanently flooded spaces of the Chýnovská Cave in collaboration with Caving Club Speleoaquanaut.

It is engaged with permanent localization and detailed documentation of limestone quarries and karst objects in the zone of the Chýnov limestones.

Regular measurements of discharge were taken in the reservoir of the Rudice karst spring. A tracer test was made on the subterranean stream of the Chýnovská Cave in collaboration with the Faculty of Science of the Charles University.

Documentation of the remains of old mine workings was continued based on historical maps and documents.

Non-destructive exploration of underground objects was conducted in collaboration with the Naše historie Civic Association: Milevsko Monastery – discovery of gold- and silver-ornamented reliquary with a nail from the crucifixion of Christ, Kadaň Monastery, Terezín, Rychnov nad Kněžnou, Letohrad, Mrtník, Dolní Lukavice, Prague, Strahov Monastery, Prague, Pohořelec, Armenia, Vyšší Brod – completion of exploration and documentation of the inaccessible tomb of the Rosenberg family, Štáhlavy.

The Club assisted in the construction of the Visitor Centre for the Chýnovská Cave.

The Club collaborated with the Administration of the Chýnovská Cave in the research, exploration and documentation of the Chýnov Karst, with the zoological department of the Blatské Museum at Soběslav, and with the Nature Conservation Agency of the



Czech Republic in the study of bats in the Chýnovská Cave and in a monitoring of hibernating bats at other sites in the region.

The Club provided guides for the International Bat Night in the Chýnovská Cave.

We supported the ringing team of the National Museum in bird ringing. This involved climbing to hardly accessible nests on trees and in rocks, using caving techniques and single-rope techniques.

We also collaborated with the Fire rescue squad of the South Bohemian Region under a contract.

The Club contributed to the Community Day of the town of Chýnov by installing an exposition on the Chýnovská Cave and a simulator of single-rope technique.

Caving Club Šumava

Club members visited several natural as well as historical underground spaces within the Czech Republic as well as abroad.

They also conduct a survey of pseudokarst caves in the Šumava Mountains.

One member participated in exploratory and documentation works in the Loferer Schacht cave system, in the Kreuzhöhle Abyss and in the surrounding caves in Austria. The Club members also visited caves in Oman, in the Bahamas, in Greece, Slovenia, Slovakia, Hungary etc.

Caving Club Macarát

The club regularly inspects historical monuments in the vicinity of Hartmanice in the Šumava Mountains (Peklo Cave, Těšov Old Mine, Jírovice Jáma Na zámku Mine) and monitors their condition. The last diving survey of the Těšov mining operation took place in December 2014. One of the Club members joined the Orca Diving Prague group for a cave diving expedition to Mexico (Yucatan Peninsula) focused on the study and new discoveries of flooded karst (cenotes).

Caving Club Jeskyňáři Plzeň

Together with the ČESON, members of the Club participated in bat monitoring in western Bohemia. They participated in several exploratory expeditions, excursions, and supportive events in different caves in the Czech Republic. They also collaborated with the Association of Friends of St. Mauritius Mine at Hřebečná in historical-mining exploration of the Krušné hory region.

The Club members cooperated with the Slovak Speleoclub of Minotaurus in the Silická Ladnica Cave, the Ponor near Napajedla and other caves on the Silická Plateau as well as in the Krasnohorska vyvieračka Cave.

Caving Club Šumavský kras

The Club members contributed to the exploration of the Kačna Jama Cave. Some Club members participated in projects dealing with the modification of historical underground and caves in Prague (e.g., access to the historic underground of Prosek – Močálka, Organization of the exhibition “City under the city” with the topic of the underground of Prague, project preparation for the reopening of the longest cave in Prague – Nedělní Cave etc.).

Caving Club Permoníci

Exploration of the Dyleň Cave in the Dyleň Karst was re-started in 2014 and continued, without new discoveries.

The Club members participated in several exploratory expeditions, excursions, and supportive events in different caves of the Moravian Karst.

In 2017, the Club members joined international expeditions to Armenia and Nagorno-Karabakh.

In 2019, the Club members participated in the international expedition to Osetia focused on a survey of karst phenomena on the Khosh-Charangang Plateau and the Bakhty-Lapyrag Plateau.

Caving Club Liberec

The Caving Club explores caves of the Ještěd Karst and the Jizerské hory Mts., regularly monitoring bat numbers in the caves of the Ještěd Ridge, the Bohemian Paradise and partly also the Česká Lípa area. The Club 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.

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.

The Club benefits from a long-lasting collaboration with several 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.

The Club members organized or joined expeditions to Macedonia, Montenegro, Serbia, Slovakia and Romania.

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 scientific research

in the caves and bat counting at selected sites. The Club actively collaborates with staff of the Bohemian Switzerland NP and also with Faculty of Science, Charles University, and the Czech Academy of Sciences. 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.

Caving Club Bozkov

The Club is active at many sites in the western Krkonoše Mts., the Krkonoše piedmont area and the area of Mt. Králický Sněžník in the Morava River valley. The major achievements in the last few years include the discoveries of new spaces in the Bozkov Dolomite Cave, which is open to the public and still subjected to prolongation works (Chodba naděje – Corridor of Hope). An exceptional success of the Club members is the result of speleological explorations in the area of Vítkovice and Křížlice in the Krkonoše Mts.: a new, 60 m long cave, called U Brádrů, was discovered at a place where a subtle belt of crystalline limestone is exposed to the surface but has not been indicated in any geological map. In 2018, the Club received an award for the most outstanding discovery in the Czech Republic for these works. In the last four years, the Club members produced a new, detailed documentation of the whole area of interest and new maps for 45 known or newly discovered speleological sites.

In collaboration with the cavers of the Georgian speleological club, the Bozkov Club organized four speleological expeditions to the area of Imereti and Racha in western Georgia. Detailed maps of some important caves were drawn during these events, and new cave continuations were discovered (Racha 2001, Melouri and Bgheri caves). With-in these expeditions, the Club also collaborated with the Agency of Protected Areas of Georgia (APA) on a preparation of a project aimed at the opening of the A. Okrojanaschvili Cave in the Samergelo area to the public. Besides, the club members participate in research programme RiS-10717 “Long-term comparative study of morphological and hydrological changes in the drainage systems of polythermal glaciers” by exploring glacier caves on the Svalbard Islands.

The Club organizes lectures and cultural events for the public, including the traditional Caving Ball.

Caving Club Albeřice

The Club explored mainly caves, mine workings and geological sites in the Krkonoše Mountains (northern Bohemia). This involved the exploration, documentation and geological investigation. About 35 caves in the eastern part of the Krkonoše Mts. were subjected to multi-proxy research. The club cooperated with the Administration of the Krkonoše National Park.

After six months of water pumping from the Albeřická Cave, new spaces 350 m long were discovered. The cave became the longest and deepest cave in the Krkonoše Mts. (725 m in length and 38.1 m in elevation difference).

The Club members published many reports and articles about their scientific activities. They wrote a book about their activities and collaborated as co-authors on the publication of two additional books.

The Club opened the Kovárna Mine in the Obří důl Valley to the public. Contemporary activities are conducted to make another part of the mine accessible for tourists – between the Mezipatro Gallery and the hereditary Prokop Gallery.

Caving Club Broumov

The Club practices research, registration and documentation of pseudokarst phenomena in the Broumov area.

In the period of 2017–2021, many new localities were discovered, mapped and documented. Most of them are talus-type and crevice-type caves in gorges of the Teplice–Adršpach Cliffs and the Broumov Cliffs. Besides others, the major newly discovered caves are the Dědkárna, Tygří pruhy, Psí jeskyně, Dědaboo and other caves. The most demanding research task was the documentation of the largest pseudokarst object in the Czech Republic, the Teplická Cave. In order to start mapping the cave, the polygon sequence was gauged through the entire cave including side tracts, and many profiles were measured. The polygon was geo-referenced by accurate GPS localization. At the end of 2021, the length of all measured underground parts was ca. 1,950 m.

Long-term microclimate monitoring was started in three vertical profiles in the Teplická Cave. As a very special task of pseudokarst terrain mapping, the abyss of Teplická Macocha was mapped using drone-driving photography and subsequent photogrammetry processing. Much attention was given to root stalagmite phenomena and their ecological function. 70 samples from 8 caves were analysed by genetic sequencing in order to determine their symbiotic components. Members of the Club were also active in the region of Bohemian Karst, discovering, mapping and documenting many objects, e.g., the unique Tygří past Cave, in collaboration with other caving clubs. In their research activities, the members of the Club collaborate with scientific institutions in methodology, data collection and processing: among others with Charles University – Faculty of Science; Czech Academy of Sciences – Institute of Geology, Microbiological Institute etc.

Caving Club Trias

The Club members worked at sites of Vápenný Podol and Železné hory Mts.

They collaborate with the staff of the Administration of the Železné hory Mts. PLA in the study of bat fauna.

Caving Club Antroherpon

Biospeleological research was carried out in the Czech Republic and abroad (caves of the Czech Republic, Slovenia, Montenegro, Bosnia and Herzegovina, Slovakia, Hungary, Poland 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.

Caving Club Býčí skála

Activities in years 2017–2021 were performed at the following sites:

Květáková – Otokářská corridors:

Major advances were made in this part of the cave after the installation of a powerful mud pump. Prolongation works employed the hydromining method, which was conducted in a closed-circle regime with no effect on the quality of the Jedovnický potok Stream.

The Květáková chodba (Cauliflower Corridor) was prolonged by over 130 metres.

In its terminal part, the corridor branches in a fan-like manner, reaching above the Větrný tunel (Windy Tunnel) in the Svozil Cave in plan view, but 40 m higher. A small free opening appeared in the ceiling with a free continuation. After its widening, we entered a vertical abyss ca. 20 m deep. It was named the Hypr Abyss. A side branch of the abyss was equipped with fixed climbing irons and a ladder.

We filled the abyss with water up to the overflow to the Otokářská Corridor. After stopping the inflow, water from the abyss was escaping in volumes of several cubic metres per hour. After multiple filling, an outburst of water to the Svozil Cave occurred. An impassable channel appeared, but we managed to get through after several working events. The connection, ca. 30 m long, is called the Banana Corridor.

This discovery interconnected the longest closed loop in the cave, which gave the surveyors a chance to improve the map documentation, although the deviations were almost negligible.

A new branch was opened at the beginning of the Otokářská chodba (Slaver Corridor). The corridor diverging to the left forks after 20 m.

The left branch re-entered the Avocado Chimney near its bottom after some 80 m, which generated another big closed loop. The corridor was called the Lower Manganese Corridor.

A complicated branching of minute passages is located beneath the Avocado Chimney. These passages were cleaned, and the area was called Zeleninová zahrádka (Vegetable Garden).

The right branch, which received the name Upper Manganese Corridor, could be cleaned in a length of ca. 80 m. The corridor meanders notably, continuing across three sumps, domes and chimneys. Works in this space are at the very limit of possibilities. The situation with the air is critical; therefore, the terminal tract received the name Death Zone.

Svozil Cave:

In the Windy Tunnel, we managed to descend down to the water level, which probably communicates with the Dóm ticha (Silence Dome) and the Barová Cave.

Here, we succeeded in digging through the Banana Corridor, thus creating a connection to the newly discovered Hypr Abyss in the Slaver Corridor (see above).

Böhler Corridor:

We managed to make an interconnection between the Böhler Corridor, the Central Chimney, the Studňovitý (Well) Chimney and the Předšň Hall. This interconnection confirmed that the two chimneys represent integral parts of the same system. A new, very interesting loop was established this way.

Corridor of Brno-based Cavers:

An attempt was made to pump the terminal sump-like closure of the corridor. The water level was lowered by ca. 3 m without finding a passable continuation. An intensive inflow of water was, however, encountered at low water level.

Corridor of Adamov-based Cavers, Purple Corridor:

Intensive works were focused to this area, long stretches of corridors and chimneys were cleaned and equipped with steel climbing irons drilled into the rock and by steel ropes.

We progressively reached as far as to the intersection with the fault in the SE at the height of 100 m above the stream, and finally even the interconnection with the Odporný komín (Nasty Chimney) and the Old Adit 120 m away.

Vertical tracts of the Purple Corridor were equipped with climbing irons.

This established a new loop between the Hlinité síně (Loamy Halls) and the Big Hall.

Loamy Halls:

Vertical steps in upper tiers and in the direction to the Májová Cave were equipped with new ladders and rope traverses. This created a new path from the upper tier of the Loamy Halls to the Smradlavá princezna (Stinky Princess) Corridor and further to the Kočárová chodba (Coach Corridor), or to the Májová Cave.

Májová Cave – Devil's Dome:

A small opening with a weak draught was discovered in the rear part of the Devil's Dome. Its widening provided passage to an open corridor with a lake and a dome 6 × 2 m in size. The newly discovered spaces received the name Vodní svět (Aquatic World).

Rising continuation of the right corridor was prolonged for ca. 20 m with the aim to find a dry path to the Barová Cave. The effort has not been successful yet. An open continuation has not been found in the left corridor behind the lake either: the corridor ends with a blocked chimney. We plan an underwater exploration of the lake, some 7 m deep, obviously interconnected with the Jedovnický potok Stream.

The path to the terminal parts of the chimney was equipped with climbing irons. The length of the discovered spaces is about 50 m.

Chimney above the Seventh Abyss:

A short horizon was discovered in the apical part ca. 30 m above the stream. A possibility of further continuation was checked using test pits. The horizon was, however, found to pass into a chimney with a dangerous cave-in of limestone blocks.

Paleontological research in the Barová Cave:

Members of the Club have been conducting a long-lasting paleontological research in the Barová Cave since 2011 already. The finds are processed in the Anthropos Institute of the Moravian Museum in Brno. They are dominated especially by bones of the Cave Bear but also Cave Lion, Wolf, Hyena and other animals. The unique paleontological sections allow to study the bones directly at the site of the find.



Archaeological research in the Hall of the Býčí skála Cave:

In 2020 and 2021, our members conducted archaeological research in the Hall of the Býčí skála Cave, being authorized by the Palacký University in Olomouc.

Altogether six test pits were excavated. Numerous artefacts were found (remains of wagons, amber, ceramics etc.) including anomalous amounts of cereals, woods, skins etc.

A wooden pole from the Hallstatt Age was found on the bottom of Test pit 4.

Test pit 5 provided information of the untouched “Big Wankel Burning Site” and Test pit 6 reached the “Wankel Paving” which appeared to be a naturally detached fragment of a rock pillar.

Summary of the whole research was presented at the conference at Blansko in 2021.

Other activities:

Intensive mapping was conducted in the caves of Býčí skála and Barová. A new, precise digital map of the cave was elaborated and updated for the present state of discoveries. Survey of the newly discovered spaces is continuously under way.

Caving Club Vratíkovský kras

The Club members were engaged in a surface survey of the Vratíkov Karst. In cooperation with the Czech Hydrometeorological Institute, they installed new piping and a reservoir in the Vývěr u jedle Spring.

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

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 65 m was reached. The collapse is probably located in the uppermost portions of the Chimney in the Rudický Dome in the Rudické propadání Cave.

Rudické propadání Cave: remapping a part of the cave system – Water corridor from the ponor.

Regular revisions and repairs of rope crossings and ladders were made in the Rudické propadání Cave.

Based on an agreement with the Administration of the Moravian Karst PLA, the national nature monument is regularly cleaned of garbage.

The Club members took part in expeditions to the caves in Georgia, into lava caves in Iceland, in the Temnice area in Slovenia, and in the Shaanxi 2017, 2018, 2019 Expedition to China.

Three members of the Club are members of the Cave Rescue Service of Czech Speleological Society.

Caving Club Křtinské údolí

The Club is active in the Křtinské údolí Valley in the Moravian Karst. They are focused mainly on exploration works in the Nová Drátenická Cave, Výпустek Cave and Bezejmenná Cave.

The Club members participated in the publication “Josefovské and Křtinské valleys – an exceptional part of the Moravian Karst. A model example of natural and historical-social development.”

The Club regularly cleans the Křtinské údolí Valley and checks and documents the caves in the valley.

A regular bat census was conducted at the individual sites.

Caving Club Vilémovická

Exploratory works concentrate mainly to the Vilémovická propadání Cave to the part behind the sump, where a new space 15 m long was discovered. The other space under exploration in the Vilémovická propadání Cave is a small abyss in the Velký Dome.

Some prolongation works were completed in the Kajetánův Sinkhole, the cave was equipped with fixed ladders and a repair of the timbering was continued.

At the site of the Daňkův žlíbek Cave, exploration was conducted in the Velký Dome.

Caving Club Tišnovský kras

Club members participated in several exploratory expeditions, excursions, and supportive events in different caves in the Czech Republic.

The Club organizes Open Day events in the Králova Cave every year with ca. 800 participants.

Caving Club Dagmar

Prolongation works concentrated mainly to the localities of Propadání V Jedlích, Dagmar, U Jedelské cesty and Jedelská ventarola. The greatest discoveries were achieved in the Propadání V Jedlích Ponor, where new spaces several tens of metres were discovered.

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 areas in Romania and Croatia.

Caving Club Labyrint

The Club is a cave diving organization. The condition of the caves of Malý výtok, Stovka and Propadání Punkva was continuously monitored, and the line was repaired. Dives were taken in the area of the outflow of the Small Sinkhole with initial mapping. Exploration of flooded areas in the Amatérská Cave–Constant Inflow and the Dome of the Echo was conducted in cooperation with the Topas group. Connections between the Sholim Bowl, Cemetery Flower Well, and the Chocolate Factory emergence were newly discovered and followed by research. As a part of the team's overseas activities, a diver training trip was made to Dordogne and Lot. Members of the Club took part in a joint expedition organized



by the Czech Speleological Society and the Institute of Geology of the Czech Academy of Sciences in cooperation with the Institute of Karst Geology of the Chinese Academy of Sciences and the Institute of Geological Survey of Xian, Shaanxi Province, China. Participation in the Xibalba expedition in Mexico included video and photographic documentation, and mapping in the centres of Tatich, Ek Muk, Nuuk Wuuts, Yan Tuunich.

Caving Club Hluboký závrť

The principal site of the Club is the Kombajnérka Sinkhole.

The Club 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.

The club members joined expeditions to the karst plateau of Gernik (Romania) in cooperation with members of other caving clubs. Some members also collaborate in several projects in Slovakia.

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 Hynštova ventarola Cave and the Kůlnička Cave. In the Kůlnička Cave, a new, lower level was discovered, winning the award for the most significant cave discovery in the Czech Republic in 2018.

Members of the Club conduct rescue speleological research in the active quarry of Mokrá near Brno.

The Club also 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 Lopač Cave.

The Club members organized or joined the expeditions to Slovakia, Poland, Austria, Caucasus Mts. or Osetia. They were very active in the publication and presentation of the achieved results.

Caving Club Jihomoravský kras

Several exploratory events in the Na Turoldu Cave included the discovery of 71 m of new corridors on the U Kobry premises. In the Zlaté síň Hall, a fossil tooth of *Lepidotes maximus* was found.

In the Liščí díra Cave, new spaces were discovered behind the Učitelčin Dome. The works continue with clearing rubble in the Pod Vrcholem Cave.

The entrance to the Damocles cave was secured. Fossil bones of the woolly rhinoceros (*Coelodonta antiquitatis*) and the bison (*Bison priscus*) were found here.

Several exploratory events took place in the Pavlovské vrchy Mts. A cave with a fox was discovered.

The club members collaborated in activities of other groups in the Moravian Karst and Javoříčko Karst. They participated in expeditions to Bulgaria, Romania, Montenegro, China, Kosovo, Poland, Slovakia, Serbia and Iceland.

Caving Club Suchý žleb

The Club members were mostly working in Sinkhole No. 1 on the Harbešská plošina Plateau. Here, a shaft was driven to the present depth of 55 metres. Further advance is clearly connected with a strong draught.

The other exploration works are focused on the Kravská díra Cave.

Traditional expeditions to Montenegro were undertaken within international activities of the Club.

Caving Club Holštejnská

The main exploration site of the Club is still the Černý Závrt (Black Sinkhole), where the Černý Chimney was progressively climbed. In its upper part, it bifurcates into two other chimneys. The whole chimney complex was equipped with ropes for further research. A reconnaissance of the chimneys was continued using SRT and was finished in the year 2021: both chimneys ended in very narrow passages.

Other activities included widening of a narrow, complex and sloping meander in the main direction of the cave. The overall length of the meandering corridor from the lowermost point of the shaft was extended to ca. 80 m, where the corridor ends in a narrow impassable continuation.

For safety reasons, the entrance shaft of the cave was secured with concrete rings.

The current state of the survey is reflected in the map of the Černý Sinkhole, as attached.

In the Holštejnská Jeskyně (Holštejn Cave), excavation of test pits was carried out in side passages and in the terminal part of the Main Corridor, where works continue on cave prolongation.

We occasionally tour the public in the cave, last on the occasion of the International Year of Caves and Karst (IYCK).

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 dóm (Bat Dome). Behind this dome, the team managed to penetrate into other spaces in several steps. For example, we found a second connection to an already known dome, the so-called Blátivý dóm (Mud Dome), where we are currently trying to find a connection to the cave of Nová Rasovna–Lipovecká chodba, part Alpy, at two places.



Currently we are working on a new map of this cave.

The Club members participated in the expeditions to the Notrjan Karst in Slovenia and to the Slovak Karst.

Caving Club Tartaros

The main activities of the Club concentrated to the Lopač Cave, Vintoky Cave, Studená Cave and Roggenfdorf Cave.

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 ground-penetrating radar of the RTG company.

The Club members organized joint expeditions to Ukraine, Russia, France, Italy, Romania, Serbia, as well as Bosnia and Herzegovina.

The Club organizes the annual Speleofórum cave conference.

The Club members were very active in the publication and presentation of the achieved results.

Caving Club Topas

Prolongation activities were continued in the Kamenný ponor Cave, in the Horní Suchdolský ponor Cave, in the Nová Amatérská Cave and Spodní Suchdolská Cave.

The Club also contributed to the work at sites maintained by other teams in the Czech Republic.

The Club members organized, or participated in, the expeditions to Bosnia and Herzegovina, Slovakia, USA, Ukraine and Slovakia.

The Club members were very active in the publication and presentation of the achieved results. They also collaborated on documentaries about the Amatérská Cave, about lava tubes caves in Iceland and a 3D documentary from Sardinia, Italy.

Caving Club Cunicunulus

The Club is engaged in mining history and exploration and documentation of historical underground spaces in the region of the Vysočina Highland.

The Club co-organized an international conference on historical silver mining called Stříbrná Jihlava 2019.

The Club members were very active in the publication and presentation of the achieved results.

Caving Club Plánivý

Activities were continued in the Amatérská Cave, in the cave system of Piková dáma–Spirálka, and in Cave 13C.

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.

The Club members also participated in the expeditions to China, France and Austria.

Caving Club Moravský kras

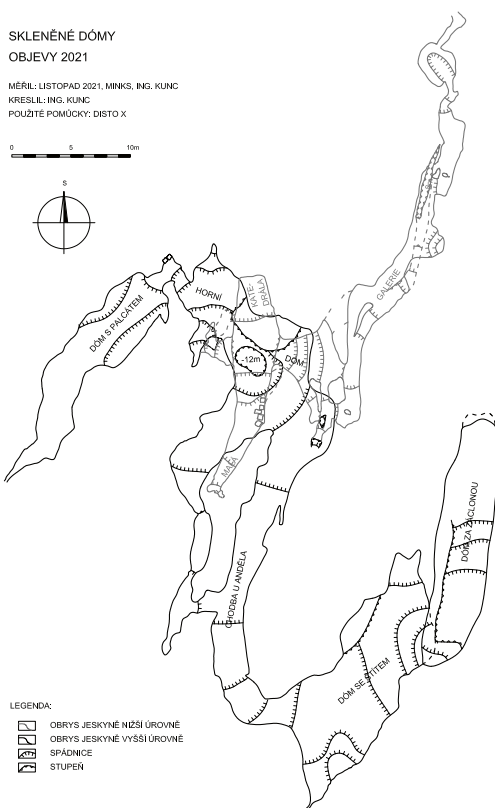
In the years 2017–2021, we concentrated on our traditional locality: the Matalova Vymodlená Cave. Here, we achieved partial success. The Ztracená chodba Corridor was extended to a total length of 140 m, and the Děda Chimney, 10 m high, was discovered at the intersection of tectonic structures. We now proceed towards the cave in the Velká dohoda Quarry.

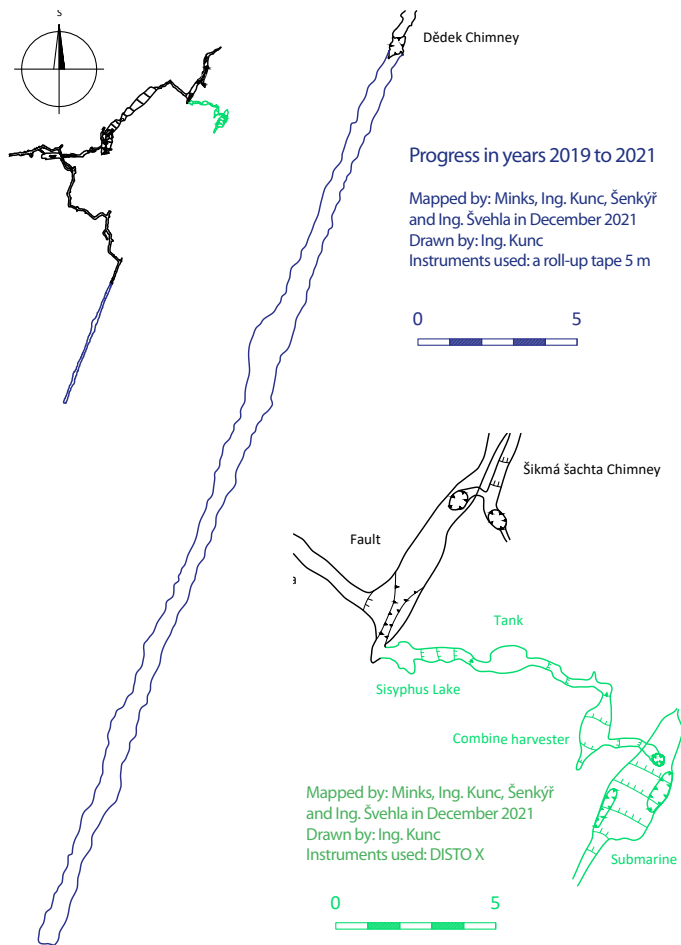
In the lower levels of the cave, we penetrated behind the Sisyphus Lake into rooms called the Tank, Kombajn (Combine harvester) and Ponorka (Submarine). The total length of the new spaces is ca. 30 m. We also conducted two pumping experiments, which demonstrated losses of water in an unknown continuation behind the Gregor Dome.

In the Elfí domeček Cave, we discovered a room 5 × 10 × 1.5 m in size. It was named the Brumbálův dóm (Dumbledore Dome). After that, we followed solid rock and draft and penetrated 5 m further by digging in the direction to the Korálový závrt (Coral Sinkhole).

Activities in their full intensity started in the Michalka Cave: re-excavation of the Křížova test pit and removal of old, allochthonous deposits. The room of Zašívárna was also discovered; however, it is directed towards the surface, which makes further exploration pointless.

The greatest discoveries were made in the Skleněné dómy (Glass Domes). We discovered a system of five domes and two corridors here in 2021. The total length of the newly discovered spaces is about 300 m. The corridors are called Galerie U Anděla, while the domes are called Malá katedrála, Horní dóm, Dóm s Palcátem, Dóm se Štítem a Dóm za Záclonou. All domes display wonderful dripstone decorations.





A map of new discoveries and progress in the Matalova Vymodlená Cave.

Caving Club Myotis

The club achieved significant success in 2020: it managed to discover 360 m of new spaces in the Ševčík Sinkhole, including a dome with an area of 30 × 30 m.

The Club members collaborated with other teams in the Czech Republic and Slovakia in the exploration of sites they supervise. They also contributed to exploratory activities in Slovakia, Slovenia, Romania, Kosovo or Montenegro.

The Caving Club maintains the Speleomuseum in a building of the local authority at Vilémovice. The Club organized the 13th annual meeting of friends of the shale underground “Shale” at Budišov nad Budišovkou in 2019 and also a meeting of cavers in 2018.

Caving Club Devon

The primary interest of the Club is speleological research in the northwestern part of the Moravian Karst: the Vavřínecká plošina Plateau, Veselický žleb Valley and the related western tributaries of the subterranean stream of Punkva, Pustý žleb Valley, tributaries of the Sloupský potok Stream and the Sloupský potok Stream.

The principal and traditional locality of our group is the cave of the Okrouhlík Sinkhole. In the last years, we concentrated our effort to the terminal parts of the cave, particularly to the Jezírková chodba (Lake Passage), where activities are still continued. The other sites of ongoing work in the last years include the Irainova Cave and the Blešárna Cave.

Our divers took part in expeditions to Slovakia, contributing to the exploration of the terminal portions of the Silická Ladnica Cave. The divers also made repeated drill dives in the area between the Spirálka Cave and Piková dáma Cave.

Other diving was realized in the Kessel Cave and in the adjacent Attersee Lake in Austria. We visited the cave of Hirlatzhöhle in the Dachstein massif near Hallstatt and climbed the peaks of the Stubai Alps.

The Club members participated in shooting of six parts of the Czech TV documentary "Magic abyss" about water. The divers are presented in episodes from the quarry at Blansko and in the Piková dáma Cave.

We conduct a close, long-lasting collaboration with other speleological groups, most notably with Caving Club Pustý žleb. The key locality is the Nová Amatérská Cave. The last years were mainly dedicated to diving exploration of the subterranean reach of the Punkva River (Šolimova mísa, Tůň Babických kovozemědělců): we assisted in the transport of diving equipment, photographic documentation of the events and cave survey. The diving exploration was participated by one of our divers. We also provide assistance at the sites of Nová Amatérská Cave – Broušek Shaft, Shaft beyond Europe and India.

Our collaboration with Caving Club Jihomoravský kras focuses on the caves of Na Turoldu, Zámecká jeskyně, Liščí díra and Blechatka. We further participate in research during the expeditions to the Vratsa Karst area in Bulgaria, specifically in the caves of Rajna Dupka, Bukovka, Prodinka Sinkhole, Lakatnik, and in the area of Mezdra and Vratsa. Diving in the caves of Izvor Gabare and Izvor Žabokrek. An excursion to the Kameno pole Cave. On return from the expedition to Bulgaria, we visited the Poleva Cave at St. Helena in Romania.

We helped Caving Club Javoříčko with the exploration of the Komáří Cave and Za Hájojnou Cave.

We visited the sites of Horní Suchdolský Ponor, Spodní suchdolská Cave, Horní suchdolská Cave, U Hrušky Sinkhole and Kamenný Ponor (Ovčín) with Caving Club Topas.

Caving Club Aragonit

The Club worked mainly in the Temné skály Cave, where a new entrance was pierced and secured, enabling vertical transport of extracted material. The Club members were also individually engaged in work and expedition activities both within the karst areas of the Czech Republic and abroad.



Caving Club Pustý žleb

The Club continued the works in the Shaft Beyond Europe and India, which was reopened after more than 50 years in 2016. The entrance shaft had to be stabilized by heavy concrete reinforcement. New stable iron ladders were installed as well. The Club members carried a new survey and photographic documentation of the cave. Exploration by digging started at several places.

The Nový Sloupský Corridor (caves under the Broušek Shaft) remained the traditional site of the Club and was subject to many excursions related to surveying works and hydrological observations.

Works on the construction of a new digital map of the whole system of the Amatérská Cave (caves related to the Punkva River) started in 2017. Almost 50 km of passages were digitized or newly re-surveyed and converted into Therion SW. The main field works run in the Nová Amatérská Cave, Nový Sloupský Corridor, Punkevní Cave and Sloupsko-šošůvské Caves. Some interesting exploratory works (revisiting of historical sites) were performed in the Sloupsko-šošůvské Caves during the surveying works.

Intensive explorations were carried out in the underground subterranean stream of the Punkva River in the Nová Amatérská Cave in 2020, when almost 1 km of the new, mainly underwater corridors were found, and a connection between the Šolim Bowl and underground outflow of the Punkva River was finished. The newly discovered parts were named the Tunál Tunnel after one of the members of Absolon's group – K. Divíšek.

The Club members were also participating in many foreign projects and expeditions in collaboration with other clubs. Several trips were organized to Kosovo, where the works focused on the Radavc Cave. The Shaanxi project continued in China until 2019 with large explorations mainly in the Tianxingyan (Sky Star) Cave. Further expeditions were stopped due to Covid travelling restrictions. Regular expeditions called "Medúza" were continued on the Dalovica Plateau in Montenegro. A complete map of the Dalovica pecina Cave was finished in 2019. An attempt to pass over through the 4th sump was not successful due to high water levels. We started exploration in the Secret Cave close to the Dalovica pecina Cave in 2021.

The Club will celebrate its 30th anniversary of becoming an independent club under the Czech Speleological Society in 2022. We prepare a publication summarizing its the Club activities on this occasion. The Cabin, close to Suchdol, which has been the base of the Club since 1957, went through a major reconstruction during the past few years.

Speleohistorical Caving Club Brno

Excavation works were continued in the Novodvorský ponor Cave as well as in the Závrt u Borovice Sinkhole.

The Club also contributed to the work at sites maintained by other teams in the Czech Republic.

Excursions were undertaken to Slovakia, Austria, Ukraine and France.

The Club organizes a competition and an exhibition of carbide lamps.

Caving Club allied to Podyjí NP

Works aimed at the adjustment of the entrance to the Silberloch Gallery were carried out.

Monitoring of block movement and climate was performed using the standard set of methods. Reports on 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.

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

Speleological club Orcus was established in 1971, and later became one of the founders of the Czech Speleological Society. The Club focuses on the exploration of non-karst caves in sedimentary flysch rocks of Outer Western Carpathians. There, the Cyrilka Cave, the longest crevice-type cave in Czechia, reached the present length of 552 m. The Kněhyňská Cave with the depth of 57 m is the second deepest crevice-type cave in Outer Flysch Carpathians. The main area of interest lies in the Moravian-Silesian Beskydy Mts., where many non-karst caves are closely linked with the development of landslides.

The main foreign expeditions of the Orcus Club were organized to the karst area of the Crimean Mountains, to Spain or Norway.

Caving Club Hranický kras

Research was principally focused on the Hranice Abyss where surveying and documentation activities took place.

At present, two major grant research projects are realized in the Hranice Abyss in collaboration with researchers Prof. Ivo Pavlík and Assoc. Prof. Milan Geršl of Mendel University in Brno. They deal with the study of guano and water.

Drills of the components of the Integrated Rescue System of the Czech Republic were held at the Hranice Abyss in years 2019 and 2021. They were organized by the Club in co-operation with the Directorate General of the Fire Rescue Service. These drills practised procedures of rescue of cave divers from the area of the Hranice Abyss. The drills were participated by divers of the Hranický kras Caving Club, Cave Rescue Service of the CSS – station Moravia, the Fire Rescue Service of the Czech Republic and the Police of the Czech Republic.



In 2019, Club members organized eight lecture events with presentation of exploration and research in the Hranice Abyss in years 1960 to 2019.

Caving Club Sever

Exploratory works concentrate mainly to localities in the areas of Na Pomezí and Lesní Čtvrť near Vápenná.

Measurements using devices TM71 were continuously performed in the cave at Staré Podhradí, in the Rasovna Cave and in the Na Špičáku Cave in collaboration with the Institute of rock Structure and Mechanics of the Czech Academy of Sciences.

One member of the group organizes exploration of old mine workings in the Jeseníky Mts. This activity is focused on the registry of old mine workings as well as on lecturing.

Caving Club Mladeč–Vojtěchov

In the period of 2017–2021, our group made an effort to find a dry passage to areas behind the first sump in the Rachava Cave. The sump had been already passed through under water, but the access was extremely difficult. Before finding another route past the first sump, our group does not aim at the exploration of the second sump. In the same period, only reconstruction works were conducted in the Kadeřín Cave, such as the securing of the entrance and the ladders. No prolongation works were performed in this period. A new detailed map of all spaces is under construction for the Ve štole Cave (In the Adit Cave). We pursued reconstruction works and reinforcement of timbering in the entrance adit. A new plan is being assessed to find and explore other parts of the caves. Members of our group repaired the common sanitary and accommodation base in front of the entrance to the Ve štole Cave. Speleotherapy (treatment of chronic and respiratory diseases) is still practised in this cave.

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 the Nízký and Hrubý Jeseník Mountains.

Caving Club Estavela

Principal research activities were conducted in the Javoříčko Cave and in the whole massif of Špraněk Hill. Activities at the upper level of the Javoříčko Cave concentrated to the Olomoucký Dome area, specifically to the main cave-in. Here, Club members initiated works on removal of blocks in the central part in order to lower the top of the whole accumulation, hence to penetrate beneath the coulisses of the main corridor.

The Club members newly started works at the U základů Sinkhole, where a new winch was installed for an easier transport of material from the sinkhole.

Works on 3D surface maps of Špraněk Hill continued with the aim to create a 3D model of the Javoříčko Cave. Mapping was also conducted in the segment of the Javoříčko Cave called “Jeskyňě míru” (Peace Cave) and in other parts of the cave system.

Caving Club Hádes

The Club conducts research of historical underground spaces and mine workings.

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 worked mainly in the Hvozdecká hora Cave. Systematic excavations led to the extension of the cave length by 45 m in 2017–2021 (20 m of which were open spaces). A new system of transport of material from the cave was developed. Exploration works continued in the northern part of the cave.



The Karel Dome, Maissel Sinkhole (Photo by M. Audy)

**THE MOST IMPORTANT DISCOVERIES IN THE CZECH REPUBLIC
IN 2017–2021**



*Dome behind the Curtain, a dripstone waterfall, Punkevní Cave
(Photo by P. Zajíček)*



DIGITAL MAP OF THE AMATÉRSKÁ CAVE SYSTEM

Jan Sirotek (Caving Club Pustý žleb)

The Amatérská Cave System in the Moravian Karst is the longest cave system in the Czech Republic. Besides the Amatérská Cave, it includes several other caves such as the world-known Sloupsko-šošůvské and Punkva Caves together with the Macocha Abyss. Its known length exceeds 50 km. This cave system has been subject of speleological research for more than 300 years. The complete map of the whole system has not been presented yet.

We have completed maps of the Sloupský Corridor, Bludiště Milana Šlechty and Krematorium (parts where major explorations took place in 1990s) in 2000 using digital technology and published them in a monograph about the Amatérská Cave. As we learned that the previous survey, conducted by Příbyl and Rejman of the Geographical Institute, carried a few mistakes, we proceeded to high-precision survey of the main polygon of the New Amatérská Cave using geodetic methods as a part of our work. We had an idea to finish the complete map of the Amatérská Cave in a digital form within the next few years. Due to the focus on other exploration projects, this project fell asleep for a couple of years.

We have switched to Disto, PocketTopo and Therion line as a club in 2014. A map of the New Sloupský Corridor was completed in Therion as the first part of the system. We had to revise all older measurements and digitize the existing analogue sketches and plans. Missing parts were newly surveyed by the above mention technique.

We were urged to finish the map of the whole cave for the upcoming 50th anniversary of the exploration of the Amatérská Cave in 2019. We started an intensive survey in early 2017. We had to migrate all the existing data into Therion and convert the existing maps of the Sloupský Corridor, Bludiště Milana Šlechty and Krematorium, while all the other parts had to be newly resurveyed. We spent almost every weekend surveying the cave in one or two groups. There were many parts to be surveyed: all the walls and details in the main corridor, the Východní Macošská branch and all the small branches. All the surveys were done using Disto and PocketTopo and connected to the points of the main polygon with fixed coordinates. We also used available data from 3D laser scanning which was conducted in the main corridor around the Bludiště Milana Šlechty by the Institute of Geonics and the Czech Hydrometeorological Institute. Many parts of the existing maps had to be redrawn due to missing survey data or missing altitude information. Underwater surveys performed by divers in the Konstantní přítok and the subterranean flow of the Punkva River were also subject of the conversion into the Therion SW.

The works were going fine so we aimed at a higher quality level and decided that the final digital map would cover not only the New Amatérská Cave but the whole system related to the Punkva River tributaries. We migrated all survey data on the Old Amatérská Cave provided by members of Caving Club Holštejn led by Pavol Mravec. A map of the Punkevní Cave was delivered by Vratislav Ouhrabka of the Cave administration of the Czech Republic directly in the Therion format. We had to map just a few missing parts during three survey trips. We could particularly use also the basic map of the Sloupsko-šošůvské Caves covering the parts accessible to public. We received all the dive surveys from the Červíkovy Cave and Čtyřicítka as well as from the Stovka Cave in

the Punkva drainage tunnel. The rest was either converted from analogue maps and old survey diaries or newly resurveyed. Our colleagues of Caving Club Plánivý, especially Radek Nejezchleb, helped us significantly with digitizing of the complex map of the Piková dáma – Spirálka Cave System. We could also use some existing data from the Nová Rasovna and 13C caves.

We were not very successful in “hiring” many enthusiastic Therion digitizers, so the kilometres were not accruing quickly. We finished the map of the New Sloupský Corridor part at the end of 2018. The final map at the scale of 1 : 500 is longer than 2 m and, as such, it does not fit to our caving cabin wall. The total length of the corridors between the 1st, 7th and 10th sumps is 5,885 m.

We finished the complete map of the Amatérská Cave itself including the Old and New parts, the New Sloupský Corridor and the sump to the Macocha Abyss at the occasion of the exhibition organized to the 50th anniversary of the exploration. It was for the first time in the history (June 2019) that we could precisely evaluate the length of the cave (27,434 m) and the altitude difference (184 m) which were the subject of many speculations before.

The biggest remaining challenge is to finish the map of the Sloupsko-šoňůvské Caves. The complex system of corridors and vertical pits at several levels was precisely surveyed in 1948–1950 by J. Vodička and his colleagues. Unfortunately, there exists just a paper map without surveying data. The only valid data we could use was the basic map of the public part of the cave provided by V. Ouhřabka. The rest of the polygons and the parts discovered since 1950s had to be resurveyed. These works are still continued, and we hope to finish them within 2022. In the meantime, the map of the Punkevní Cave was almost finished except the upper parts of the Skleněné dómy (Glass Domes) above the Cathedral. Smaller survey works are also continued in the Nová Rasovna Cave.

A complete drawing in the digital Therion map displays cave corridors 49.1 km in length as of February 2022. We expect that another 1.7 km are still to be finished. We expect to finish the whole map at the end of 2022.

| Part | Digital map | To be finished | Total |
|---------------------------------------|-----------------|----------------|-----------------|
| Old Amatérská Cave | 3,588 m | - | 3,588 m |
| New Amatérská Cave | 19,002 m | - | 19,002 m |
| NSK – Broušek Shaft | 5,885 m | - | 5,885 m |
| Punkevní Cave (incl. drainage tunnel) | 7,244 m | 500 m | 7,744 m |
| Sloupsko-šoňůvské Caves | 6,376 m | 1,000 m | 7,376 m |
| 13 C Cave | 1,153 m | | 1,153 m |
| Piková dáma – Spirálka Cave System | 3,927 m | | 3,927 m |
| Nová Rasovna Cave | 1,952 m | 200 m | 2,152 m |
| Others | 121 m | | 121 m |
| Total | 49,127 m | 1,700 m | 50,948 m |



CURRENT STATUS OF DIGITAL MAPPING OF THE AMATÉRSKÁ CAVE SYSTEM

We are planning to publish the final map of the whole system in the form of a map atlas at the scale of 1 : 500. This publication will follow the project of cave atlas of the Moravian Karst started by Igor Audy and his colleagues. The atlas should be a part of a complex monograph about the cave systems related to the Punkva River tributaries which will include not just the maps but also chapters presenting a complete history of explorations, speleo-topography, geology, hydrology and other scientific disciplines. There is a wide group of authors, and the book is planned to be published under the auspices of the Czech Speleological Society, Czech Hydrometeorological Institute and the Czech Geological Survey.

SURVEY OF THE AMATÉRSKÁ CAVE

We have published a set of maps of newly explored parts of the Amatérská Cave as a part of a book in 2000. During the survey, we realized that the old map by Příbyl and Rejman was not precise enough. Therefore, we decided to resurvey the whole cave. The plans were a bit postponed due to explorations behind the 4th sump in the Sloupský Corridor. We completed a map of this new part called the New Sloupský Corridor by the end of 2018. Everything was completed in digital form in Therion SW. In the meantime, we intensified our works on resurveying of the whole system. A map of the Amatérská Cave including the New and Old Amatérská cave parts as well as the New Sloupský Corridor and the Macocha Abyss in a total length of 27.4 km was completed in June 2019 at the occasion of the 50th anniversary of the Amatérská Cave exploration. Currently we continue our work on digital maps of other caves in the system such as the Sloupsko-šošůvské Caves. We try to make the maximum possible use of existing maps and measurements; in many cases, however, we have to do everything from the scratch. We use a combination of Disto and the PocketTopo application in PDA, as the currently most effective technique. Passages 35.6 km in length have been digitally surveyed as of the end of 2019. We intend to publish a map atlas of the whole system as a part of prepared book about the Amatérská Cave system under the auspices of the Czech Speleological Society in cooperation with the Czech Hydrometeorological Institute and the Czech Geological Survey.

DISCOVERIES ON THE SUBTERRANEAN PUNKVA RIVER IN THE AMATÉRSKÁ CAVE

Jan Sirotek (Caving Club Pustý žleb)

Underground course of the Punkva River in the northern part of the Moravian Karst has been a subject of interest among many karst explorers in the last 350 years. First serious explorations started in the latter half of the 19th century. The main focus was on the interconnection between the Punkva River outflow in the Pustý žleb Valley and the Macocha Abyss. The first significant milestone was the exploration of the Punkevní Cave in 1909. This became interconnected with the Macocha Abyss by digging and mining in 1914. It took another two decades to explore also the “water” path; which was permitted by driving an artificial tunnel at a simultaneous drop of water level by 6 m by extensive pumping. Another question, however, remained: what lies between the eastern wall of the Macocha Abyss and the ponors of the Sloupský potok and Bílá voda streams – the two main tributaries of the Punkva River.

Cave divers started the first attempts in the inflow sump of the Macocha Abyss in the Červíkovy Cave in 1952. In 1968, a breaking point came with the discovery of the Amatérská Cave, which is the key part of the system between the villages of Sloup and Holštejn and the Macocha Abyss. Divers of the Trygon Club dived the sump between the Amatérská Cave and the Macocha Abyss in 1975. Systematic exploration of the subterranean flow of the Punkva River in the Amatérská Cave started in 1983 by the Labyrinth cave diving club. Several hundreds of metres in upstream direction were explored within 2 years. The part upstream of the site known as Šolimova mísa was explored in a length of 70 m and a depth of –20 m in 1993. But still, the confluence point of the tributaries and the origin of the Punkva River remained unknown.

Systematic cave diving explorations were renewed in 2000. The reach of the Punkva River upstream of the Tůň BK in the Amatérská Cave was extended by 150 m, and the divers reached a cavern with an open water level called Čokoládovna. Exploratory activities in the Macocha Abyss were renewed as well. A deep interconnection (–48.9 m) between the lower lake and Čtyřcítka was found after a series of dives concentrated mainly on cleaning of the deep parts of the lower lake from trash and wooden logs. A completely new, deep part in the sump in the Červíkovy Cave was discovered in 2006, heading to the upper lake in the Macocha Abyss.

The key point for further explorations of the subterranean Punkva River in the Amatérská Cave is the Šolimova mísa, the last known upstream water level of the Punkva River in the system. This place was dived several times in the past but without significant progress. We came back to this site after 18 years in April 2020. During the first dive, we extended the upstream part to the total length of 75 m. Several interesting places for continued exploration were noted, and we came back within a week. A new big downstream tunnel elongated in SE direction was explored after passing through a branch coming from a depth of –20 m. It is obvious that this tunnel is the main tube where the Punkva River flows. A chamber with open water was reached after 100 m, and the tunnel was found to continue by another sump.

It was obvious that the explorations would require a committed approach after initial solo dives. A team of several divers and their supporters was established by teaming up several caving clubs (Pustý žleb, Plánivý, Topas, Devon, Speleoaquanaut, Cavediver – SK,

Tartaros, Býčí skála, Tišnovský kras, Holštejnská, Hluboký závrť). The second chamber with open water was discovered after passing a sump –20 m deep within the third dive. The tunnel continued in another sump where we reached a depth of –30 m and later on –43 m. All the newly discovered passages were surveyed immediately within the exploration dives.

Next dives were focused on searching of the upstream part (without real progress) and on the interconnection of the newly discovered parts with another branch from the U Bílé kašny Dome, which was successful.

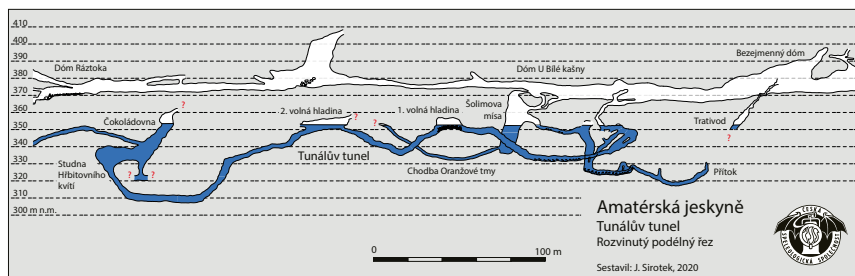
We came back to the depth of the downstream part in August 2020. The sump elbow was passed, and the tunnel was followed by another 100 m to the depth of –27 m. The final push dive was realized in September by a team of three divers. We used EAN50 gas for the travel to reduce decompression times and took a small bottle of oxygen for safety. Starting from the endpoint of the last dive we got to a large pit which brought us to open water in the Čokoládovna Chamber, which was explored by diving from another side of the sump. We restored the guidelines from Tůň BK during two dives and reached the same place from the other direction. By this crucial milestone we have completed another chapter in the exploration of the subterranean course of the Punkva River in the Amatérská Cave. The newly discovered tunnel was called “Tunál tunnel” after the nickname of Karel Divíšek, a close colleague of Karel Absolon. 700 m of newly discovered corridors were surveyed and documented.

Location of the origin of the Punkva River still remains an open question. A small progress was the identification of a small water level under the Bezejmenný Dome, which belongs to the Punkva River according to conductivity measurement. We will definitely try to dive at this site in the near future. Construction of the very first longitudinal profile of the system, which was used to study the context of different water levels, was an important output of our works in the Amatérská Cave in 2020. We identified a significant mistake in the altitudes of survey points in the Bludiště Milana Šlechty and further part of the cave.

Further explorations were stopped by the flood and very high water levels in October. Our big thanks belong to all team members who participated in the explorations.



M. Bartošek is preparing for a dive in the Punkva River in the Amatérská Cave (Photo by T. Svoboda)



A longitudinal profile of the underground Punkva River in the Amatérská Cave showing the newly discovered parts (Compiled by J. Sirotek)

ŠEVČÍK SINKHOLE

After Luboš Trtílek adapted by Jan Kelf Flek (Caving Club Myotis)

The research activities concentrated especially to the Ševčík Sinkhole on the Harbešská plošina Plateau near Vilémovice.

The first excavations started on 2 March 2019. The sinkhole historically served as a waste pit and a trash heap for Vilémovice. All sorts of garbage were piled in a thickness of almost three metres. After another 1.5 m, we reached the first loose blocks with open cavities.

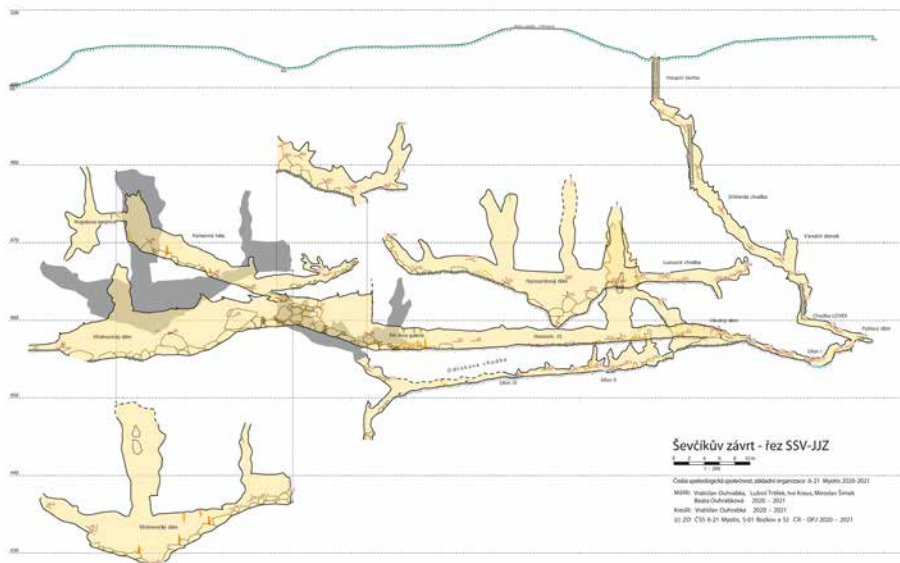
The stream was leading us through this unconsolidated mass to a point where it diverted downward to a vertical abyss. This abyss finally turns into a beautiful well-shaped shaft 8 m deep. This primary discovery was virtually of key importance

At the bottom of the abyss, the stream continued downwards at an angle of about 45°. The first 4 metres were passable. The stream was lined by a thin, undercut flowstone crust and sharp, blade-like edges formed by erosion. After the above mentioned distance of 4 metres, the crust ended by a horizontal flowstone table formed by standing water. After passing the flowstone bottom, the cave was found to continue; however, by an impassable joint 10–20 cm wide.

The joint was about 3 m long until it closed again on the bottom in the form of an impassable outflow falling to another vertical shaft. Squeezing into the shaft itself was very unpleasant. After some time, we managed to widen the opening a bit but it still remains the most critical place in the cave until these days.



The Vilémovice Dome (Photo by L. Trtílek)



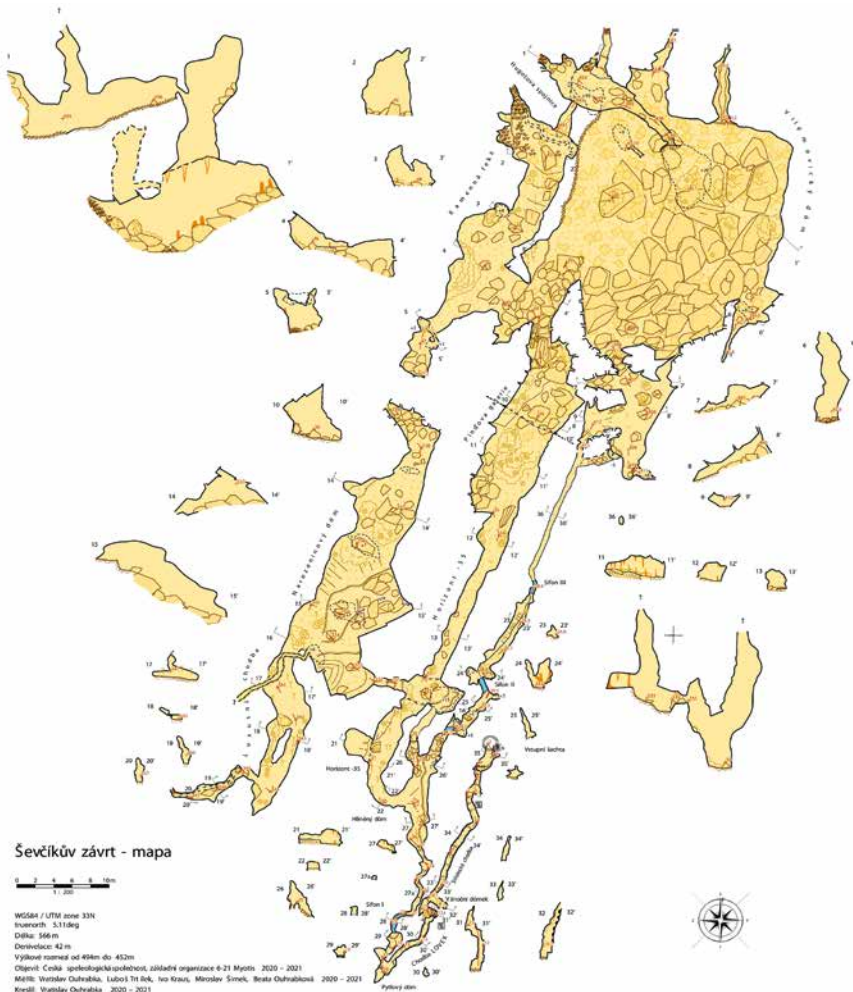
*Ševčík Sinkhole – a cross-section NNE–SSW, Czech Speleological Society, Caving Club Myotis, 2020–2021
Measured by: Vratislav Ouhřabka, Luboš Trtílek, Ivo Kraus, Miroslav Šimek, Beata Ouhřabková,
Drawn by: Vratislav Ouhřabka, 2020–2021*

The shaft was 4 m deep, 1.5 m in diameter at its broadest point. Cave continuation from the shaft was almost horizontal. Anyway, it was only a small conduit in compact limestone, big enough only for an arm.

Getting beyond this point lasted exactly half a year. It was 6–7 metres in length. We passed at a cost of loads of material: tens of drill bits, tens of blasting sticks and approximately 2000 pyrotechnical cartridges.

The shaft ended with a dome-like space ca. 2.5 m in diameter. From here, we traversed just a narrow sloping passage to the water level. The sump accommodated a thick layer of sediment washed from the whole cave. We were positioned at a depth of -40 m, the length of the cave was almost 60 m, with all passages just of the size for one man. A stepped shaft of its kind.

After extensive bag-filling activities, when only filtered water was pumped to the surface and mud was deposited in bags, mud eventually started to detach from the sump ceiling. When passing through the sump, arms were buried in the mud up to the neck, and you still could not feel the bottom. The layer of mud must have still been well over a metre thick. After six months of these baths, a sensation finally arrived. The opposing slope of the sump involved an ascent through an 8 m high, very narrow passage, which opened into a large hall.



Ševčíkův závrť - mapa

WGS84 / UTM zone 33N

číslovrstev: 511,0m

Délka: 566 m

Derivace: 42 m

Výškový rozdíl od ústní do: 452 m

Objevit: Česká speleologická společnost, záložní organizace 6-21 Myotis 2020 - 2021

Měřili: Vratislav Ouhrabka, Luboš Trtílek, Ivo Kraus, Miroslav Šimek, Beata Ouhrabková 2020 - 2021

Kresil: Vratislav Ouhrabka 2020 - 2021

Compil: Theodor G.D. (2023-10-02) on 27.11.2021

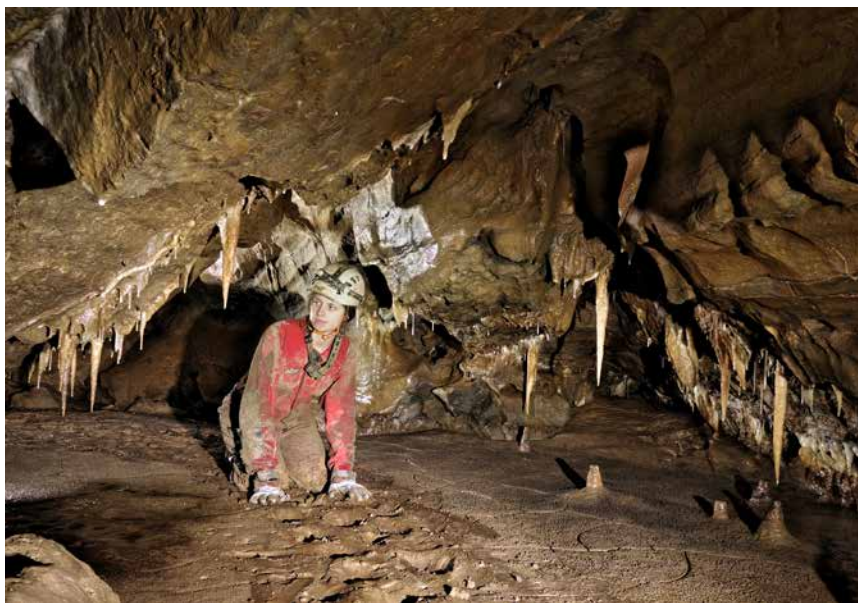
IG ZD CSS 6-21 Myotis, 5-01 Bolek a ŠI CR - OPI 2020 - 2021

Legenda

| | | | | | | |
|-----------------------------|-------------------|---------------|------------------|---------------|---------------|---------------|
| mělký bod (nestabilizovaný) | nepředělaný závrť | výška kamínku | bahno | státní | svinové jádro | zlom |
| mělký bod (stabilizovaný) | závrť | hraděná směna | hloubka propasti | válcový | státní | lanový žebřík |
| mělký bod (stabilizovaný) | šlátek | směna | vstupnice | okružný | vlnitý | lanový žebřík |
| polygonyový šlátek | válcový | převis | kámen | předpokládané | okružný | pevný žebřík |
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The first visit induced goose bumps to us. The moment you first rise your head from the mud, in a neoprene suit, and see the dripstone balustrade with only darkness behind... it was clear enough that our effort was a success and that a brand new cave leaves us to walk in.

To this date, the cave has a polygon length of 566 m and an elevation difference of 42 m. I believe that this is by far not the end but we must not fall off in our effort. A totally new world did open to us. So many tempting, promising sites where to look for a continuation. Unfortunately, those active and regular sloggers can be counted by fingers on a single hand. So all in good time. The highest priorities in the upcoming months include the main outflow corridor and a geodetic survey of the new entrance.



The Luxusní chodba – Luxury Corridor (Photo by L. Trtílek)

HYDROGEOLOGICAL RESEARCH OF THE HRANICE ABYSS, THE DEEPEST UNDERWATER CAVE IN THE WORLD

Helena Vysoká, Jiří Bruthans, Karel Žák, Lukáš Falteisek

An intensive hydrogeological research of the Hranice Abyss and neighbouring Teplice nad Bečvou spa was conducted in years 2015–2017. There are several very deep underwater karst caves/shafts known around the world, but only little is known about flow patterns or water mixing in deep hypogene karst shafts. The Hranice Abyss (HA) was newly surveyed by ROV in 2016 and proved to be the deepest underwater cave in the world, exceeding 404 m in the depth of underwater spaces. However, its bottom has not been reached yet and its limits at a depth exceeding 200 m are poorly known. The HA shares a thermal, CO₂-rich water source with the adjacent Teplice nad Bečvou spa (22.5 °C; CaHCO₃ 2.9 g/L; CO₂ 2.5 g/L). The location of recharge and the flow area of thermal mineral waters in the Hranice Karst are a matter of debate. The Hranice Karst is currently increasingly studied due to the planned construction of a dam on the Bečva River just several km upstream of the spa.

Based on water chemistry, the HA contains a mixture of shallow and thermal groundwaters. Shallow groundwater comes from a local source, which has a different chemical composition and different sulphur isotopic values than the near Bečva River. Thermal water is mixed with 5–10 % of modern water (infiltrated after 1950), based on low tritium and CFCs contents.

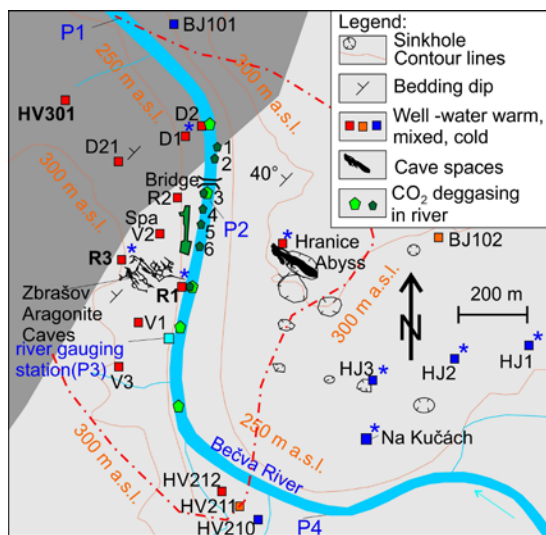


Fig. 1 A schematic hydrogeological situation of the studied area. HA = Hranice Abyss, ZC = Zbrašov Aragonite Cave, red dashed-dotted line = approximate extent of thermal water occurrence, asterisks = wells strongly affected by the fluctuations in the Bečva River level. Red and blue arrows = main inflows of warm and cold water to the HA

Vertical profiling and deep sampling (up to 180 m depth) in the HA revealed distinct changes in temperature and TDS with depth (thermoclines and chemoclines). Waters in separate parts of the HA differ in their chemical composition; seasonal water mixing takes place down to at least 180 m depth. A density-driven flow model of water mixing was suggested. In winter period, cooled water in the HA lake sinks to the depth (>265 m), which provides mixing of the whole water column. During the summer and autumn, stratification occurs. This conceptual model agrees with the chemical composition, vertical pattern of temperature and

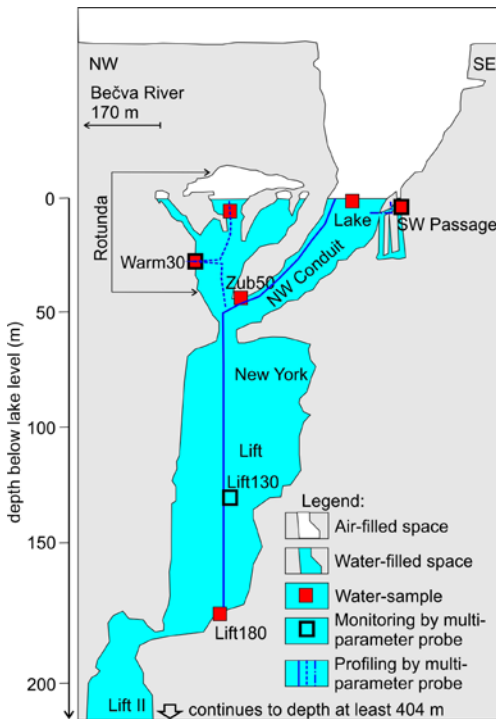


Fig. 2 An idealized vertical section of the HA with sampling sites and profiles and monitoring sites measured with a multiparameter probe.

electrical conductivity, periods of CO_2 degassing (winter), turbidity occurrence and the presence of aerobic organisms at great depths (no redox gradient was found). Surprisingly, just three small inflows of warm water were discovered by divers in the HA until now, all in rather shallow depths: 30, 40 and 60 m. Inflows of warm water have temperatures around 20–21 °C, which is close to thermal water of 22.5 °C occurring in the Teplice spa. Most of the HA is filled with water having temperatures around 16–17 °C down to a depth of at least 265 m. No warm water is ascending from the depth (warm water has the lowest density). This strongly indicates that the HA no longer provides the ascending path for warm water now, being sealed from major deep warm water inflow. A blockage at a depth is thus probable.

There are several causes for turbidity: algae in the shallow part of the lake in the summer, clay particles released by divers, reddish clots formed by conversion of Fe^{2+} to Fe^{3+} (Fe^{2+} stable in warm water source, Fe^{3+} formed by oxidation



Fig. 3 An outlet of warm water at a depth of 30 m. (Archive of the Caving Club Hranický kras)



Fig. 4 An outlet of warm water at a depth of 60 m.
(Archive of the Caving Club Hranický kras)

where warm water mixes with a cold source and by oxygen released from diving). Water level oscillation in the HA is hydraulically controlled by the Bečva River level; when the river water table rises above the level of the HA, the level in the HA rises and *vice versa*. Based on this relationship and the altitude difference, the point of hydraulic connection with the Bečva River was localized (500 m upstream of the shortest connection of the HA and the river). Nevertheless, the river water does not enter the HA due to large volumes of flooded cave spaces between the HA and the river.

Fluctuations in the Bečva River level strongly affect the fluctuation of water levels in the thermal spa wells. Hydraulic effect of the

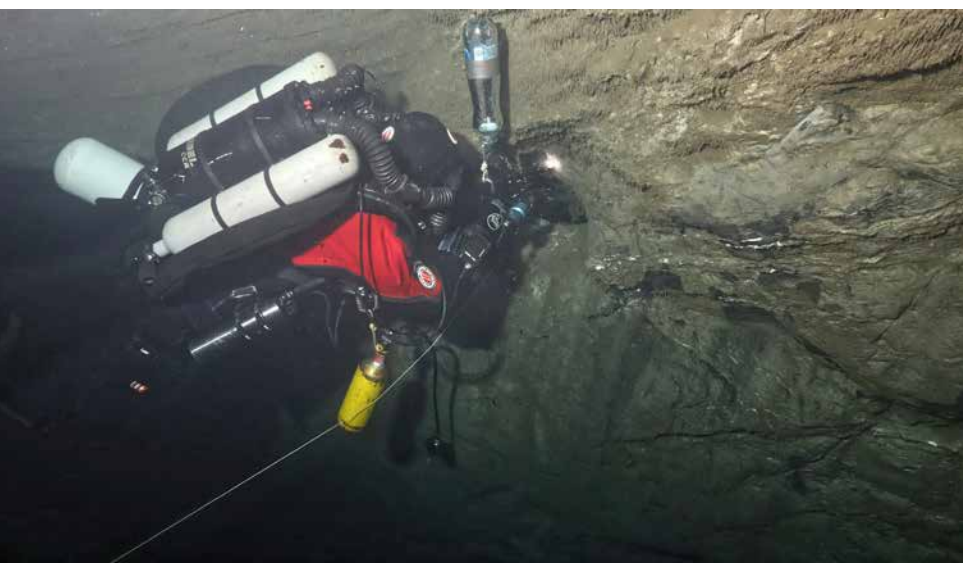


Fig. 5 An outlet of warm water at a depth of 60 m. David Čani takes a water sample.
(Photo by M. Guba)

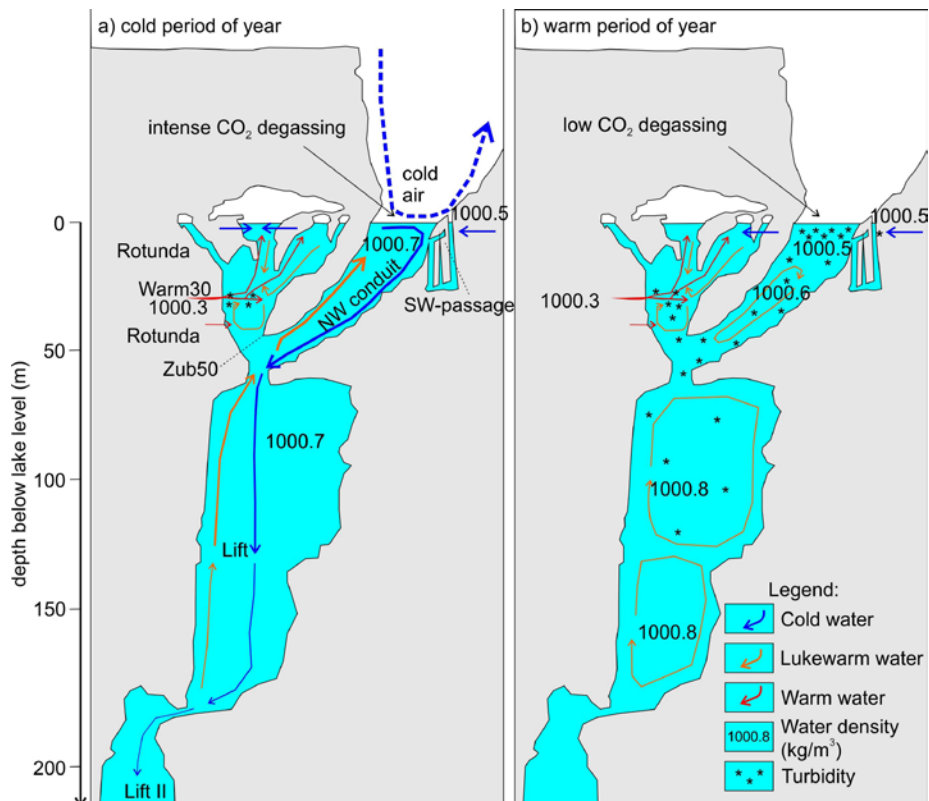


Fig. 6 A model of water mixing based on measured data and water density in the cold period of the year (a) and in the warm period of the year (b). The frequency of asterisks corresponds to water turbidity.

river on wells is traceable as far as 400 m from the river, even in areas with presently cold groundwater. This shows that the groundwater table is flat, and limestones are strongly karstified in a wider vicinity of the river. The natural yield of thermal waters was assessed to be 12–17 l/s, according to measured electrical conductivity in the Bečva River and the mixing equation. This is close to the results of the historical collective pumping test in the spa. Based on natural yield, temperature of thermal water and terrestrial heat flux, the extent of the deep flow area of thermal waters is likely several tens of km² and its recharge area is located in the Oderské vrchy Hills.

Hydrogeological research was performed within the Neuron Expedition project and realized by members of the Czech Speleological Society (Hranice Karst and Geospeleos Caving Clubs). For more information, see: Vysoká, H., Bruthans, J., Falteisek, L. et al. Hydrogeology of the deepest underwater cave in the world: Hranice Abyss, Czechia. *Hydrogeol. J.* 27, 2325–2345 (2019). <https://doi.org/10.1007/s10040-019-01999-w>



**THE MOST IMPORTANT DISCOVERIES ABROAD
IN 2017–2021**

*The Dome of Czech–Georgian
Collaboration – the wildest portion
of the Bgheri Cave
(Photo by O. Skalský)*

EXPLORATION OF THE ĐALOVIĆA PLATEAU IN 2017–2021

Jan Sirotek (*Caving Club Pustý žleb*)

Speleological research of the Đalovića Plateau continued in the past five years and tied on previous expeditions running since 2003. The focus still remains on the Đalovića pecina Cave (*Pečina nad Vražjim firovima*).

Three expeditions in 2017, 2018 and 2019 were mainly dedicated to finishing of the detailed digital map of the Đalovića pecina Cave and were organized in collaboration with Polish cavers from the caving club of the Polytechnic in Wrocław.

The new map is based on a revision of all existing maps, sketches and surveys and their conversion into Therion SW. We have spent hundreds of hours with mouse clicking and converting drawings into the Therion scraps and their joining into the final map. We have identified missing parts in summer 2017 and focused on surveying them. This included *Kristalni* and *Blatni kanal* in the *Labyrinth* part, the *Srksov Pomorski Put* and connection between the main corridor and the *Srksov Pomorski Put*.

The expedition of 2017 was dedicated to surveying of the end parts behind the sumps in the *Srksov Pomorski Put* which was dived through in 2010. Diving was complicated due to the lack of sherpas helping with the transport of the equipment and swimming over the long lake in front of the first sump. We have surveyed the first sump (*Serbian*), the passage between the sumps and the terminal parts behind the 3rd sump discovered in 2011. We prolonged narrow passages to the distance of 150 m far from the main corridor.

Other teams continued with surveying in other parts of the *Srksov Pomorski Put* and its connections to the main corridor. Chimneys and branches in the main corridor were explored by the Polish part of the expedition. Most efforts concentrated on the rock block collapse at a place where the main corridor significantly changes its direction behind the *Cathedral*. Brave Polish guys squeezed through a narrow window and got into a new dome 40 m wide and 50 m long. It received the name *Sala Buchmana* after *Kazimierz Buchman*, a formal leader of the caving club of the Polytechnic in Wrocław. A minor corridor extends from this dome in the southeastern direction, ending with a small lake. New discoveries of the total length of 500 m were surveyed. Another right-side branch, 200 m long, was explored behind the *Cathedral* towards the *Srksov Pomorski Put*.



Fig. 1 The dome of *Sala Buchmana*
(Photo by J. Sirotek)



Fig. 2 An overview map of the Dalovića pečina Cave

We also dedicated a few days to digging on the surface at a place which was identified as the closest to the terminal parts of the Labyrinth. These works did not continue in the next years due to the request from the Montenegrin cavers and the planned “official” opening of the new entrance as a part of the project of making cave accessible to public.

The summer expedition of 2018 was fully focused on surveying and photo documentation in the Labyrinth and the Srksov Pomorski Put.

We came back to the explorations of the end parts behind the 1st sump in August 2019. Construction works in the canyon also started this year in order to open the new entrance to the cave and connect it with the Bistrice temple by a cable way. We were shocked to see the destruction of the canyon walls by a mining notch for the new road. Tons of rock fell down to the canyon. We spent two days transporting all the equipment to a point in front of the first sump. Four divers stayed there over the night and continued to the 2nd bivouac in the Red Gallery above the Sala Nosača Dome. They continued to the 3rd sump the next day with a diving equipment for two divers. The aim was to swim through the 3rd sump and try to dive the 4th sump. Unfortunately, the progress of the team was stopped by high water levels behind the Big Brother Dome, where an unexpected sump was formed. We had to turn back and start the transportation of all equipment from the cave.

In the meantime, the rest of the team finished all survey works and a complete map of the cave was finished at a scale of 1 : 200 to 1 : 500. The total length of the cave is 19,599 m and the denivelation is 241 m. This means that it has been almost doubled since we first came here in 2003: then, the length of the cave was 10 km.



Fig. 3 Straws in the Secret Cave (Photo by J. Sirotek)

The last expedition took part in August 2021. The main goal of the mini expedition was a reconnaissance of the discoveries in the Sala Buchmana Dome in the Đalovića Cave and a localization of a new cave in the upper part of the canyon.

We used the new entrance to the Đalovića Cave which was opened during works on making the cave accessible to the public for the first time. The new entrance leads into the part called Labyrinth. It made our way to the Cathedral and the rear parts of the cave significantly faster.

We crawled through the muddy collapse behind the Cathedral and reached the Sala Buchmana, a large dome explored by our Polish colleagues during one of the expeditions. The Sala Buchmana Dome is comparable with the largest domes of the cave. It is difficult to judge whether it is an in-flow or an out-flow from the main corridor. We speculate about a possible communication with the part of the cave called Srksov Pomorski Put due to the large volumes of muddy sediments. The profile at the end of the passage becomes narrow and ends with a small lake with a possible sump. We resolved that it made no sense trying to dive it.

We used the other days of the expedition to explore a new cave, located upstream in the canyon, 400 m north of the main entrance to the Đalovića Cave. The cave was localized by Serbian cavers in the 1980s and explored by Polish cavers from the Olkusz Speleoclub during four expeditions (2011, 2021, 2013 and 2017). The total length of the passages is close to 2 km and there is a high potential of an interconnection with the Đalovića Cave. The cave was named the "Secret Cave". We made a simple map and a photo documentation of the cave. We are now discussing a possible cooperation with our Polish colleagues to work together in this cave due to our long-term systematic exploration in the area.

TWENTY YEARS OF ACTIVITIES IN THE LOWER KARST (DOLNI KRAS, SLOVENIA)

Michal Hejna (Caving Club Tetín)

Czech speleologists, in collaboration with the Jamarski klub Temnica, have been working in the Miren-Kostanjevica region (Dolni Kras area, Slovenia) since 2001. This is an area that was significantly transformed during World War I, when the Soča Front with trench lines, underground caverns and fortifications of the Austro-Hungarian Army was located here. During the war, many caves were destroyed, caved-in or rebuilt for military purposes. A special military unit under the leadership of speleologist Herman Bock operated in the Karst area, with the purpose to search for suitable caves and their further modification.

Over the course of the last 20 years, Czech speleologists organized 31 working expeditions, which were attended by a total of 62 cavers across the entire Czech Speleological Society. The aim of the expeditions was a surface survey and documentation of the discovered or already known karst phenomena and other underground objects.

During 20 years of work in the area of the Miren-Kostanjevica municipality, we documented 1,024 underground objects over an area of approximately 28 km². These objects are represented by caves and abysses (197 objects) and artificial military caverns

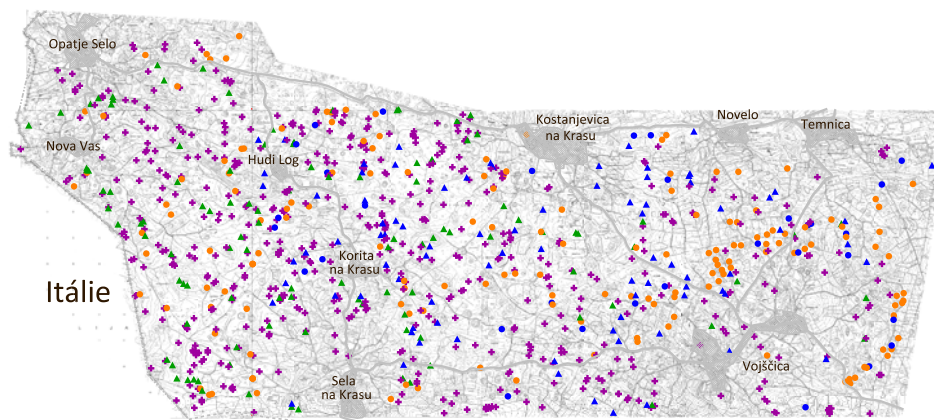


The Krompirjeva jama Cave as an example of a cave adapted for military usage (Photo by M. Majer)

(651 objects). The last type of underground objects is represented by artificial military caverns with natural karstified parts (176 objects). 124 caves and abysses longer than ten meters were registered in the Kataster jam (Cave register), which represents 75 % of all caves registered in this region (Hejna 2021).

The Rojstnodnevno Abyss, discovered in 2015, is the seventh deepest abyss in the Lower Karst with its depth of 104 m and the seventeenth longest with a length of 165 m (Hejna, Vítek, Šamonil, Milanič 2017; Hejna, Falteisek, Šamonil 2019). Another seven caves reached a length of more than 100 m.

Czech speleologists are also authors of the monument in honour of Czech soldiers' bravery during the 10th battle on the Soča front line in 1917, built in Korita village in 2017.



A map of documented underground phenomena: + military caverns, military caverns with natural parts, • caves. Blue coloured dots represent objects included in the Cave register.

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INTERNATIONAL SPELEOLOGICAL PROJECT KAČNA JAMA REKA EXPLORATION DIVAČA – CLASSICAL KARST – SLOVENIA

Tomáš Roth (Caving Club Plánivý; www.planivy.cz)

This Czech–Hungarian–Slovenian collaboration on a systematic exploration of the third longest cave in Slovenia was started between years 2005 and 2008. The cave of Kačna jama (Snake Cave) is located in the Classical Karst in southern Slovenia, lying on the subterranean Reka River, which sinks under the ground in the UNESCO-protected Škocjanske jame Cave. After 40 km, it re-appears under the name Timavo River in Italy. It is true that underground spaces of only a relatively small length have been discovered along this distance. Especially so if compared with the large size of the labyrinth of corridors in the ponor part of the cave system, in the first four kilometres: here, at least four cave levels are developed with a total length of corridors of almost 30 km. Moreover, a large number of gigantic paleoponors are visible on the surface, suggesting that the Reka River was sinking under the ground at different places in its history (Divaška jama, Jama Vilenica, Lipiška jama etc.), leaving behind a system of corridors as yet mostly unexplored.



Fig. 1 A partial map of the discoveries at the upper horizon levels up to 2021 – Lamski Corridor in the Kačna jama Cave

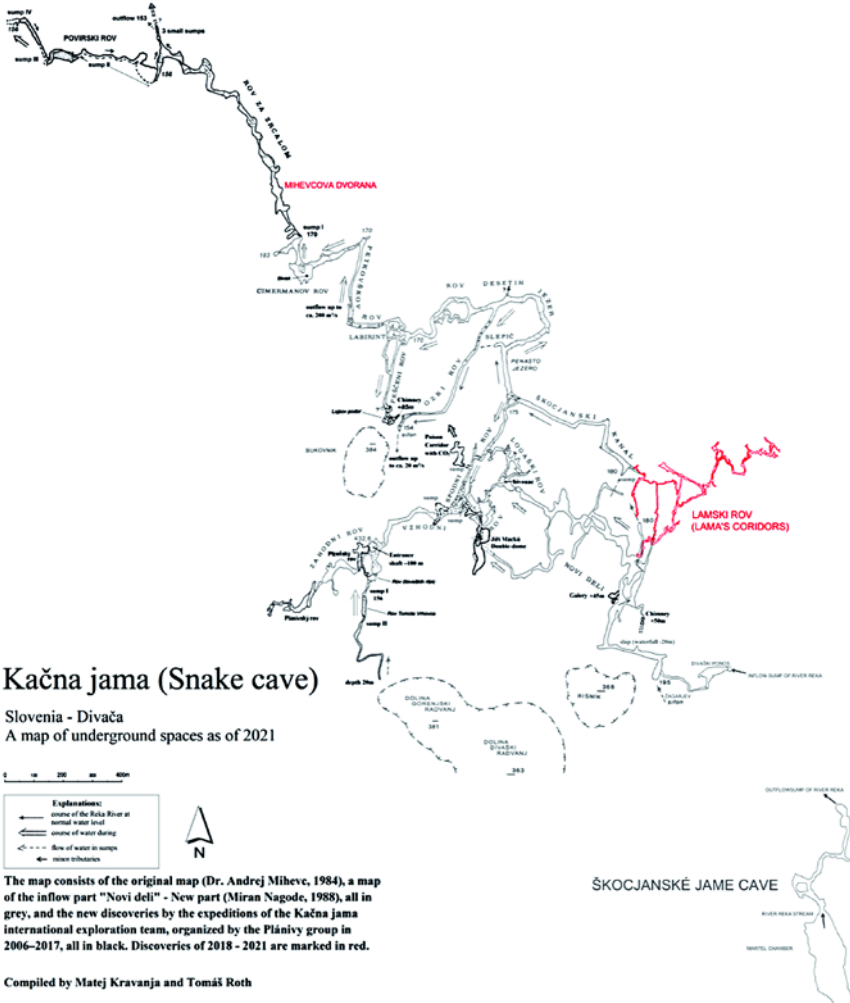


Fig. 2 A map of the known underground spaces of the Kačna jama Cave as of 2018. The map consists of the original map (Dr. A. Mihevc, 1984), the inflow part of the New parts (M. Nagode, 1998) marked in grey, and new discoveries of the International Kačna jama Reka exploration team of 2006–2017 marked in black colour and of 2018 marked in red colour.

Czech cavers started their research in the Kačna jama Cave in 2005. Then, they made their first survey of the rear parts of the cave in the direction of floodwater flow and found a great potential of the cave for future exploration. Activities in the cave are, however, complicated by the demanding transport of equipment through a maze of passages: the lowermost level lies 300 m under the surface, and the peripheral parts of the cave lie as much as 5 km from the entrance, behind the active flow of the Reka River, which may fill the cave with water up to the height of 100 m during flood events. All these circumstances require that the exploration of the cave (especially its outflow flood branch) is conducted by robust caving teams capable of running expeditions for 50 or more cavers lasting more than two weeks with continuous underground residence times of 5 days or more. Therefore, the project was joined by Czech cavers from various clubs, including those not organized in clubs of the Czech Speleological Society, and by Hungarian cavers – especially those of the Papp Ferenc club Budapest and FTSK. The research is based on the excellent, friendly collaboration with the local Slovenian cavers, especially of the Gregor Žiberna club from Divača. The expeditions to Slovenia are organized on a regular basis with the exception of the strongest covid pandemic in 2020. Each year, one 10 to 14-days' summer expedition and two to four extended weekend expeditions are usually organized.

Before the international Kačna jama Exploration Team started its activities in 2005, the official length of the cave was 12.75 km, which should be credited mainly to Slovenian cavers of the Logatec club. A systematic re-surveying and revisions of the terminal parts of the cave allowed the international CZ-HU-SLO team to discover major continuations of the cave at most terminal points. Some of them lie far from the cave entrance, while others lie immediately below the 180 m deep entrance shaft, the study of which was initiated by Czech-born Anthon Hanke already in 1888.

The most important prolongations of the cave since 2005, when the cave length was 12.75 km:

| | | | |
|------------------------------------|-------------|-------|---------------------|
| extra length obtained by re-survey | (2007–2021) | | 1.65 km |
| Planivsky rov and Plzeňský rov | (2007–2010) | | 1.00 km |
| Rov za zrcalom | (2009–2010) | | 1.00 km |
| Povirsky rov | (2011–2018) | | 0.80 km |
| behind sumps of Hojkerjeva dvorana | (2012–2013) | | 0.50 km |
| Lamski rov | (2018–2021) | | 2.90 km and more... |

At present, more than 20.6 km of corridors have been documented in the Kačna jama Cave, and hundreds of metres are still subject to survey. In addition, Slovenian cavers are involved in intensive activities towards its physical interconnection with the Škocjanske jame Cave (6.2 km) using rebreather-equipped divers. This would produce the second longest cave system in Slovenia.

RESEARCH FROM 2017 TO 2021

On 24–25 June 2017, we were invited by our Slovenian friends of the Gregor Žiberna club at Divača to join them for a diving event in the Škocjanske jame Cave (UNESCO), featuring one of the largest underground spaces in the world at the end of a unique subterranean canyon. The Martelova dvorana (discovered 1890) is over

500 m long, and 150 m broad and high. This gigantic room, however, ends abruptly, and the continuation is formed by deep sumps. Although it is separated from the Kačna jama Cave by only ca. 400–500 m of unexplored sumps, the two caves have not been interconnected yet. This 1.5-days' event was aimed at a transportation of diving equipment for four divers (Simon Burja, Sebastjan Žagar, Damir Podnar and Aljoša Krivec) who explored the spaces behind the first sump in the Zality kanál. From here, Simon Burja was challenged for the first dive in the outflow sump in the direction to the Kačna jama Cave. He made two discoveries within 95 minutes. In the direction to the N–NE, after 100 m, he managed to penetrate to a dry dome 5 × 3 m in size. From here, a dry corridor continued further but was not followed. In the direction to the E–SE, he passed to a distance of 175 m but could not find further continuation due to poor visibility (1–2 m). The event was participated by altogether 50 cavers of nine caving clubs: C. R. C. Seppenhofer, Društvo Sirena sub, JD Divača, JD Domžale, JD Logatec, JD Rakek, JD Sežana, JK Železničar, Park Škocjanske jame, Società Adriatica di Speleologia, ŠD Explorer and 9 members of the Kačna jama team from the Czech Republic. Later on, on 22–24 September 2017, a unique event was undertaken in the Škocjanske jame Cave. Its purpose was to clean the subterranean canyon and its wide vicinity from trash. It was organized by the Slovenian caver, canyoner, but mainly a great enthusiast and adventurer Bogdan Kladnik of the JD Križna jama club and the Guardians of the Earth organisation. The event was hosted by the Park Škocjanske jame club and attended by more than 190 enthusiasts of 9 countries (Slovenia, Croatia, Serbia, Rumania, Hungary, Brazil, Italy, Slovakia and the Czech Republic). More than 200 bags with trash were collected during this event. For event website see www.guardians-earth.org

DISCOVERIES IN THE KAČNA JAMA CAVE

Diving in the outflow part in the Povirski rov

The big Expedition Kačna jama Reka exploration 2017 was held on 13–24 July 2017. The Plánivy group organized the fourth international expedition, the purpose of which was to explore the space in the floodwater outflow branch of the cave with the fourth as yet unexplored sump in the Povirski rov. This expedition was a continuation of the previous one in 2011. The principal aim of the 2017 summer expedition was to pass beyond sumps S II a S III in the Povirski rov again, find a continuation in sump S IV, which was never dived, and to continue exploration of open spaces behind the sump under the Povir village if everything goes well. Diving itself started on Wednesday, 19 July 2017, after four days of difficult work: rope fixing in the cave, foundation of two bivouacs, installation of boats and particularly the transport of material. Two divers – Jan Enčev and Radek Nejezchleb – submerged at around 11:00, with bottles 2 × 12 back-mount + 2 × 12 side-mount filled to ca. 270 bars, into sump S II. The first unsuccessful attempt to find the way lasted 30 minutes. After the second attempt, over 55 minutes long, the divers emerged on the other side of sump S II. The length of sump S II was found to be ca. 415 m and its depth 20 m. Owing to the early roaming in sump S II, the consumption of air was unfortunately higher than “planned”. Both stage bottles 2 × 12 were discarded behind the sump and the divers continued their way with a twin

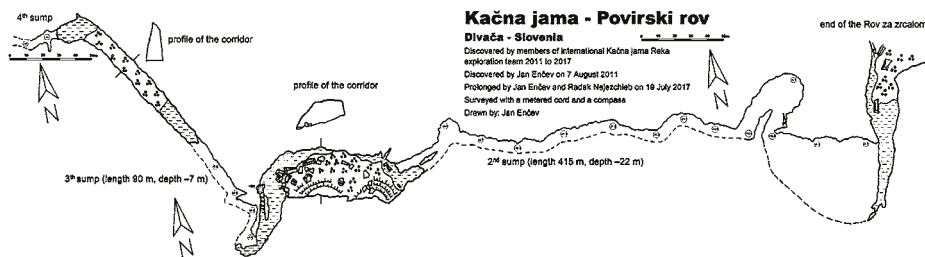


Fig. 3 A part of the map of discoveries in the Povirski rov (Povir Corridor) as of 2017 in the Kačna jama Cave

only. The way through sump S III with a poorer visibility was found surprisingly fast, and the search for further way through sump S IV started around 15:00. After several unsuccessful attempts along the right side of the sump, the divers finally managed to find an open vertical joint of a considerable size in the left part of the sump. This joint is probably a continuation of sump S IV. Exploration ended at a depth of 10 m, where the height of the joint markedly exceeded the visibility. Hence, it was not clear whether to continue up or down. The total distance crossed under water was ca. 150 m, of which only ca. 50 m in the direction promising a continuation. A major discovery in sump S IV was the finding of a strong population of olm (*Proteus anguinus*). This was also the case of the outflow meander in front of sump S II. Here, the outflow sump was dived by Josef Lukeš and found a set of smaller sumps leading to a loam-filled joint above water level at a distance of 33 m. The action behind sumps S II and S III lasted 9.5 hours. The expedition was contributed by more than 50 cavers from the Czech Republic, Hungary and Slovenia.

Discovery of the Lamski rov

A new, extensive continuation was discovered by the Czech team in the inflow part of the Kačna jama Cave towards the Škočjanske jame Cave, in a small side passage called Kokodrili on 26–30 September 2018. This is a labyrinth of overflow pressurized channels of the upper level, with corridors 5 m in diameter. The labyrinth is entered by a system of passages from the northeast, associated with a permanently high-discharge inflow of ca. 20–30 l/s. The spaces are developed at several levels. Lower levels under the Berger Waterfall communicate with the active flow of the Reka River through the outflow sump. The upper inflow corridor lies 20 to 40 m above the active flow of the Reka River, with signs of frequent flooding. The spaces are variable in their character, ranging from large, shaft-like domes and corridors with deep lakes to meandering corridors with streams. The corridors are decorated, among others, by non-traditional forms of loam stalagmites up to 20 cm tall. The newly discovered spaces hosted a number of international expeditions, which extended the length of the cave to 20 km

in 2019. After the 2020 covid break, we restored our activities in summer 2021 with a family expedition aimed at a punctual documentation and exploration of all promising side passages and chimneys. The latest expedition took place in 23 September – 1 October 2021, when the Lama's Corridors reached the length of 2.9 km and the length of the Kačna jama Cave exceeded 20.6 km. Nevertheless, our exploratory activities are not over yet: it is possible that we will return after some time with the cavers to the outflow sumps in the rear tracts of the Povirski rov (Povir Corridor).

ACKNOWLEDGMENTS

For their collaboration on the project of Kačna jama Cave, we wish to thank all friends from the Czech Republic across caving clubs as well as those not organised in the clubs. We also thank our friends from Hungary, especially those of the Papp Ferenc club Budapest, and to Slovenian friends, especially from the Gregor Žiberna club from Divača, who officially administer the Kačna jama Cave.

Felix Ziegler and his wireless system Cavelink from Switzerland is thanked for the safe course of the expedition. www.cavelink.com. Details on the individual expeditions to the Kačna jama Cave can be found on webpage www.planivy.cz. Information on our activities linked with the cleaning of caves, canyons and nature can be followed on the webpages of the Guardians of Earth organisation www.guardians-earth.org.



A joint photo of the participants of the 2017 expedition (Photo by P. Kubálek)

DISCOVERIES OF LARGE CAVES IN THE XIAONANHAI KARST AREA, SHAANXI PROVINCE, CHINA

Zdeněk Motyčka, Michal Filippi

INTRODUCTION

The purpose of this speleological project was to explore and document karst areas in the Shaanxi Province. Exploration in the Xiaonanhai Karst area started with two expeditions in 2016 (Motyčka et al. 2017). Between 2017 and 2019, another four expeditions were organized by the Czech Speleological Society and the Institute of Geology of the Czech Academy of Sciences in cooperation with the Shaanxi Institute of Geological Survey and the Institute of Karst Geology of the Chinese Academy of Sciences. Main attention was focused on the karst area close to Xiaonanhai village, located approximately 30 km south of Hanzhong City (Nanzheng County). The study area consists mainly of a north – to northeast-sloping limestone plateau called the Daya Mountain. In the north and east, the plateau continues with a wild mountainous karst landscape with deep valleys and canyons. The plateau undulates to a flat with a complex network of valleys with permanent or intermittent streams, which mostly terminate in sinkholes with cave portals or in shafts up to several tens of metres deep. A more detailed characteristic of this area was presented by Motyčka et al. (2017). Team members who participated in one or more expeditions were: J. Buček, M. Filippi, D. Havlíček, R. Husák, V. Kaman, L. Matuška, S. Mátl, T. Mokřý, Z. Motyčka, V. Pazderka, R. Pokladník, P. Rowsell, J. Sirotek, R. Šebela and Zhang Y. Hai.

THE MOST IMPORTANT DISCOVERED CAVES IN THE AREA IN 2017–2019

TIANXINGYAN (SKY STAR) CAVE, LENGTH 12,907 M, DEPTH –228 M

The four currently known cave entrances are located at the western foot of Mount Daya. These entrances pose the only access passage to the main part of the cave. The two main entrances are ponors (an active and an old one), the third and fourth are shafts (70 and 20 m deep). Entrance passages are partly narrow and very high with a clear draft. At some places, openings of corridors from higher levels can be seen in the ceiling, sometimes with tributaries (one of which is a 45 m high waterfall). The journey to the connection (called T-Junction) with the main corridor of the Tianxingyan Cave takes about 3 hours. Here, the ceiling rises to reach a height of 30–50 m (Fig. 1). To the left (downstream), a 100 m high chimney with a diameter of approx. 20 m connects to a high space called the Shaft Hall. The main corridor then continues mostly in a profile of about 15–30 (width) × 30–50 m (height) for about 600 m, where the high ceiling descends to the water table and closes the corridor with a sump. To the right of the T-Junction, the corridor extends into the impressive Mega Hall (130 × 75 × 60 m). The meandering corridor then continues for 2 km to open up to the largest space of the cave as yet discovered – the Giga Hall with respectable dimensions of 210 × 135 × 90 m. A camp was set up at the end of the hall. The journey here takes about 6 hours. Behind



*Fig. 1 A gigantic crossing of passages named T-Junction, Tianxingyan Cave, Shaanxi, China
(Photo by J. Sirotek)*

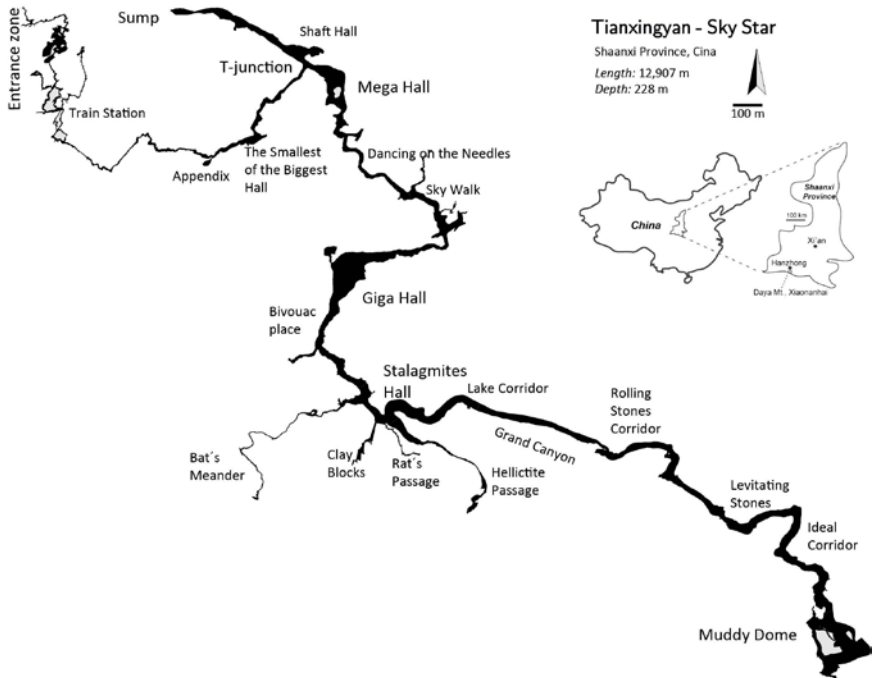


Fig. 2 A map of the Tianxingyan Cave, Shaanxi, China

this hall, the corridor suddenly drops significantly, continuing in a fair width of about 20 m, passing two significant right-hand tributaries. A lake begins from the second tributary on (over 700 m long Bat Passage): it must be waded, locally reaching up to the chest, or crossed by a boat. The lake then continues with the sloping Stalagmite Hall (140 × 40 × 66 m), which is exceptional by several stalagmites up to 10 m high. There are three branches in the hall: the fossil Helictite Passage, 450 m long, opens at a higher level, while the 200 m long Clay Blocks Passage and the 150 m long Rat Passage open at the bottom near the water level – all with no hope of a free continuation.

Behind the Stalagmite Hall, the character of the corridor changes to a 5–8 m wide gorge, initially 60 m high, which is soon divided vertically by a 100 m long rock bridge, under which the height of the corridor decreases to below 10 m. The cave further continues *via* a flooded passage (Lake Corridor), the lower part of which is about 5–10 m wide and about 10 m high to the edge, but there are much larger spaces above this edge. Another section called the Grand Canyon is narrow but up to 50 m high. The whole boating is 800 m long and it is necessary to carefully get out of the boats and transport them through Rillenkarren several times. The flooded part ends with a chert bench formed by sharp Rillenkarren. Then, the cave expands again into a massive, 400 m long corridor in a profile of about 10–20 m (width) × 30–50 m (height) (Fig. 2). Its bottom is covered with piles of huge unstable boulders (Rolling Stones Corridor). This is followed by 200 m of pools and gravel embankments. Then comes a place (Levitating stones) which must be passed by traversing above again, between and under huge unstable boulders. Behind them, the corridor significantly changes its character, and the 300 m long section is the dream of every speleologist:



Fig. 3 In the main tunnel of the Tianxingyan Cave, Shaanxi, China (Photo by Z. Motyčka)

the so-called Ideal Corridor hosting a shallow river with a comfortable gravelly bottom and an almost regular profile 30×20 m in size! Subsequently, the corridor rises again and the huge space of the Muddy Dome begins after another about 200 m. This space was created by an interconnection of several passages. During geological history, the upper part of the cave system was filled with fine sediment which, after the interconnection, rolled into the main river corridor of the Tianxingyan Cave and covered everything with mud. The mud now forms remarkable formations (muddy sinters, dripholes, etc.). Everything is incredibly slippery here.

A massive and unstable muddy-stony slope over 80 m high occurs at the end of this Hall, being connected to a massive sinter wall on one side and to a fossil corridor on the other side. The Muddy Hall itself has the shape of a side-turned L with a maximum width of 160 m and a length of 190 m! The top of the talus cone lies 110 m above the bottom! The continuation of the cave behind the Muddy Hall is through a deep lake filling a steep meander to the left. A high black window is present high on the wall with a significant tributary, perhaps from the Boniukeng Cave. This meander can be climbed from the left through a rock window to a stony slope with a 10 m rock step above the riverbed. Here, the survey has been finished for now (Fig. 3).

BONIUKENG CAVE, LENGTH 2,699 M, DEPTH -326 M

The cave is located on the sloping top plateau of the Daya Mountain. The main entrance is located at the base of a large collapse doline (80×50 m in size and 80 m in depth). A relatively large passage continues in both directions – the lower part with passages 2–20 m in height and 2–5 m in width, and the upper part with passages 2–30 m in height and 2–5 m in width. The upper part consists of a passage (subsequently branching) of a decreasing size from 15×30 m to 1×8 m (width \times height). Several chimneys were found here, up to 70 m in height. A fossil level is present here.

The lower part is technically difficult with small and deep lakes and vertical steps as much as 17 m in height. The exploration of 2018–2019 focused on this lower part. Approximately 407 m were explored and surveyed in 2018 and additional 906 m in 2019.

The farthest part of the cave is surprising. After alternating rock steps and potholes with pools in a slightly descending corridor, the character changes, probably because the cave was already connected to the older system. In contrast to the upper cave parts, the passage is divided into two different levels. The wider fossil part of the passage ("upper floor") is of unknown extent and filled with silt-sized sediments. In its bottom, a deep narrow bed of an active stream is cut ("lower floor"). A relatively strong draft is perceived at some places.

After one of other abseils, the corridor no longer has steps and is not as sloping as above, giving the impression of a possible early exit into the main corridor of the Tianxingyan Cave. The meandering riverbed, only about a metre wide, suddenly really ends, and a huge shaft appears. It is 30 × 15 m in size at its mouth, the ceiling rises at least another 10 m upwards, and the bottom disappears in a black darkness 60 metres below. At the bottom of the shaft, it is necessary to traverse the wall above the lake, cross a stretch of a straight section and pass another 20m step. In addition, the corridor turns in the opposite direction towards an unknown continuation. The endpoint of this cave is only approximately 300 m far from the nearest point in the Tianxingyan Cave, therefore, the connection of these two caves will be one of the main goals of the next expedition.

BAISHUIDONG CAVE, LENGTH 828 M, DEPTH –54 M

Based on fluorescein tracing, the Baishuidong Cave seems to be one of the main resurgences of the Tianxingyan-Boniukeng cave system. It is a relatively high, mostly flooded cave passage with several fossil parts and relatively rich speleothem decorations. The cave consists of a meandering passage up to 30 m high and several larger halls. It is terminated by a sump.

OTHER CAVES

Many other caves were discovered in the area during the mentioned period. The Heiwodong (Black) Cave, 1,233 m in current length and –168 m in current depth, is located furthest from the village of Xiaonanhai and is also the highest (1,490 m a. s. l.). This gives a significant potential for the longest cave system in the area. The Xiaonanhai (Temple) Cave, 1,036 m in current length and +34 m in current depth, is the largest spring in the whole area. Due to the huge volume of water and significant discharge variations after rains, this cave is probably a resurgence of a large, ancient, as yet unknown cave system. Some other smaller caves were also explored, making the total length of nearly 20 km for the passages discovered in 2017–2019.

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THE LATEST EXPLORATIONS OF THE CZECH AND SLOVAK SPELEOLOGICAL SOCIETY IN CAVE SYSTEMS IN RIVIERA MAYA, MEXICO

Zdeněk Motyčka

Since 2003, more than 20 expeditions have been organized by the Czech and Slovak Speleological Society to the Yucatan Peninsula. The area of interest lies near the villages of Chemuyil and Akumal, both located to the north of the town of Tulum. During these expeditions, more than 120 km of new caves were discovered and mapped till the end of 2016. The most important cave system discovered, explored and surveyed by the Czech and Slovak Speleological Society was K'oox Baal, now the 3rd longest underwater cave in the world (Motyčka et al. 2013). Since 2017, another four expeditions were organized and 16 km of new corridors were discovered and mapped. The team members who participated in one or more expeditions from 2018 were: Daniel Hutňan, Radek Jančar, Karol Kýška, Tomáš Lehman, Miroslav Manhart, Pavol Malík, Zdeněk Motyčka, Jiří Skuhrovec, František Srnec, Jan Sirotek, Lukáš Vlček, and Martin Vrábel.

In February 2018, during a revision dive in Cenote Cangrejo, two divers crawled through a small restriction and discovered 200 m of new corridors. They continued exploration the following days and discovered and mapped 1 km of larger tunnels. After

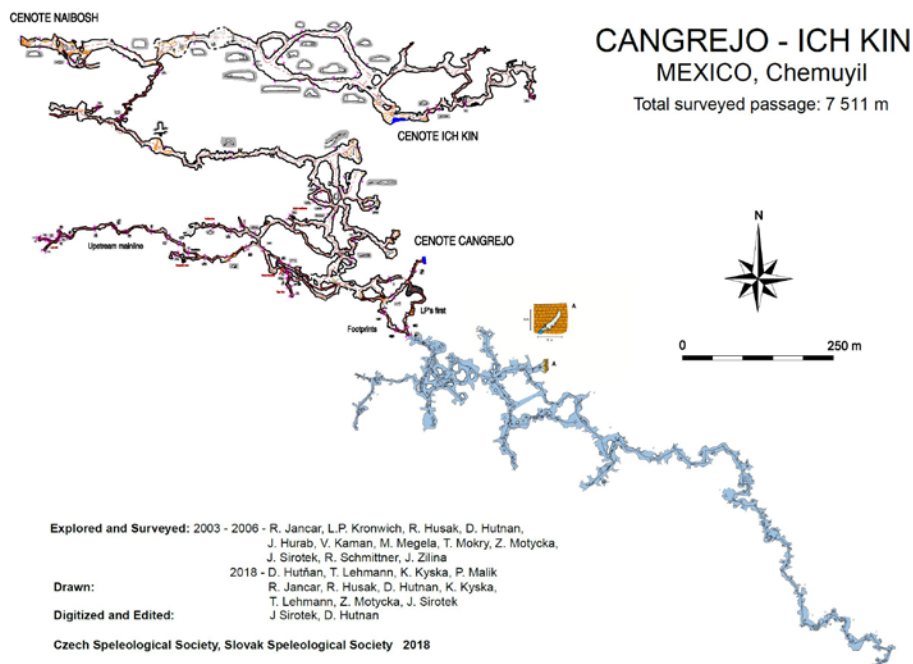


Fig. 1 A map of the Cenote Cangrejo with newly discovered passages in 2018 (in blue)



Fig. 2 Exploration in Sistema Tatich, Mexico (Photo by K. Kýška)

several weeks, the second team continued the exploration and discovered another 1,100 m. They stopped exploration in very small passages. This exploration has set the total length of Cenote Cangrejo to 7,511 m (Fig. 1). The distance between the end of the Cangrejo and the known part of the Sistema K'oox Ball is less than 30 m (Motýčka, Hutňan (2019).

In 2019, the Czech and Slovak Speleological Society opened a new project in Cenote Tatich, which has been known since 1999, after French divers led by Cristian Thomas started to work there. Before 2000, they discovered nearly 6 km of cave passages (Thomas C. et al. 2001). The exploration was continued in 2010 by Natalie Gibb and lately by Fred Davos. They discovered another 4 km of cave passages, so the total length of the Tatich reached 10 km (List of Long Underwater Caves in Quintana Roo Mexico, Quintana Roo Speleological Survey). In 2019, members of the Czech and Slovak Speleological Society discovered another 2,974 m of passages (Fig. 2), so the Tatich had a length of 13,255 m. They also resurveyed the rest of the system and created a new, detailed map (Motýčka, Hutňan 2020). The exploration continued also in 2020, with the discovery of another 2,669 m of new passages, so the total length of the Tatich is now 15,924 m (Fig. 3).

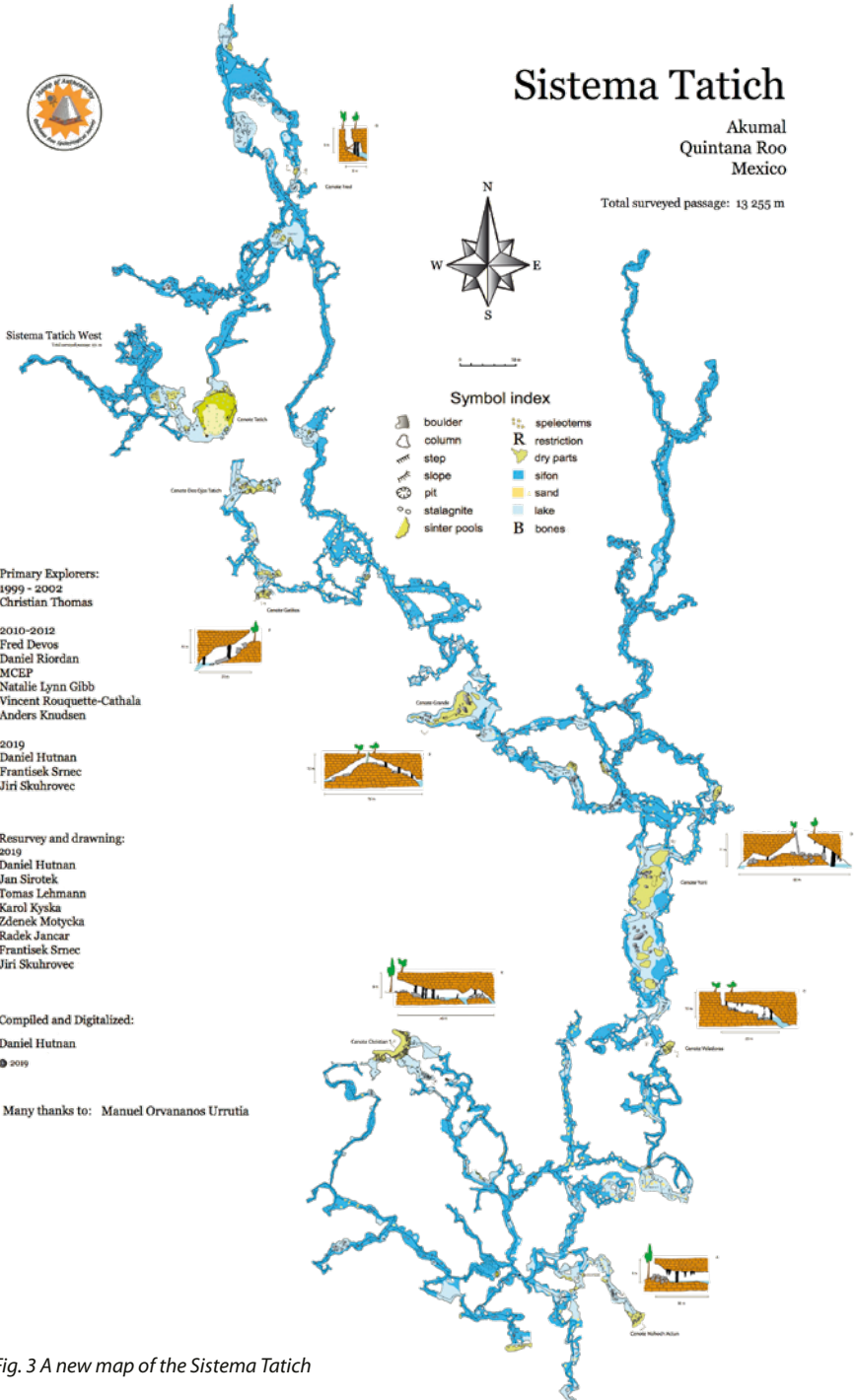
In 2017, the entrance to the new cave system was discovered and 350 m of dry passages were explored. In 2018, the exploration continued and a large and complicated system of dry corridors with many lakes was discovered (Fig. 4). The new system was named Yum Kaax. Diving attempts were realized in two lakes, and 400 m of underwater passages were discovered. Nearby, another dry cave Xul In, was connected to the Yum Kaax, so the cave was 2 km long at the end of 2018. In 2019,



Sistema Tatich

Akumal
Quintana Roo
Mexico

Total surveyed passage: 13 255 m



Primary Explorers:
1999 - 2002
Christian Thomas

2010-2012
Fred Devos
Daniel Riordan
MCEP
Natalie Lynn Gibb
Vincent Rouquette-Cathala
Anders Knudsen

2019
Daniel Hutnan
Frantisek Srnec
Jiri Skuhrovec

Resurvey and drawing:
2019
Daniel Hutnan
Jan Sirotek
Tomas Lehmann
Karol Kyska
Zdenek Motycka
Radek Jancar
Frantisek Srnec
Jiri Skuhrovec

Compiled and Digitalized:
Daniel Hutnan
© 2019

Many thanks to: Manuel Orvananos Urrutia

Fig. 3 A new map of the Sistema Tatich



Fig. 4 Yum Kaax Cave system, Mexico
(Photo by J. Sirotek)



Fig. 5 Yum Kaax Cave system, Mexico
(Photo by Z. Motyčka)

another 400 m of dry corridors were discovered and many other passages and possibilities for future exploration were registered. In 2020, during two weeks of exploration, an extensive labyrinth of dry tunnels 2 km long was discovered, explored and surveyed (Fig. 5). It features emerald lakes, filled with many kinds of speleothems. A new cenote – Nuuk Wuuts – was discovered in the jungle, approx. 500 m SW of Cenote Yum Kaax: 500 m of new passages were discovered during the first day. Next day, this new cave was connected with the nearby cave ZBK, explored in 2016 (Motyčka 2017). In 2 days, another 1,000 m of richly decorated passages were discovered, so the Nuuk Wuuts was 2.8 km long. During the last days of the expedition, this system was connected to the Yum Kaax, which had a length of 7,409 m at the end of 2020 (Motyčka, Kyška 2021). The exploration continued in 2021, and another 2 km of corridors with two halls were discovered during two weeks, as well as a new cenote – Yaan Tuunich, which was finally connected to the system, too. As a result, the Yum Kaax Cave system is 9,416 m long now (Fig. 6).

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HYPOGENE KARST OF SOUTHERN ALBANIA

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¹ Caving Club Topas

² Charles University, Institute of Hydrogeology, Engineering Geology and Applied Geophysics

The Sarandaporo River (Σαραντάπορος) springs in Greece. Its catchment has an area of 850 km². Where the river crosses the Greek/Albanian border, a narrow and short gorge is incised by the river in limestones of the flysch deposits, forming a low-permeability basin. This gorge is called Vromoner in Albanian, which means “warm”. At this site, a unique geomorphological phenomenon is developed. The river valley is crossed by a 100 km long fault with rising deep fluids. This fault crosses Albania from north to south, hosting several thermal springs (Fig. 1, 2).

Thermal springs of Vromoner at the Greek/Albanian border have been known for a very long time. Hypogene caves connected with the thermal waters have escaped attention and speleological research yet, probably due to their location at a strictly guarded border during the Cold War.

The area was explored by members of the Czech Speleological Society in the last few years.

Nine hypogene caves were explored by now. (Fig. 3, 4, 5). The Sulfur, Shpella Breshkë, Dvacitka (Twenty) and Atmos caves actively evolve by the action of hypogene processes and contain thermal water. Thermal springs rich in H₂S were found in these caves, all having a very similar temperature of 26 °C. Maximum air temperature in the caves is 29 °C.



Fig. 1 The main tectonic faults in Albania with an indicated position of the Vromoner thermal springs



Fig. 2 The giant hypogene collapse of Vromoner 180 m above the Sarandaporo River at the Albanian/Greek border is 200 m in diameter. (Photo by M. Audy)



Fig. 3 The largest hall of the hypogene Sulfur Cave – the Vesmír Dome (Space Dome) – was named after a Czech journal at the occasion of its 150th anniversary. Greece. (Photo by M. Audy)

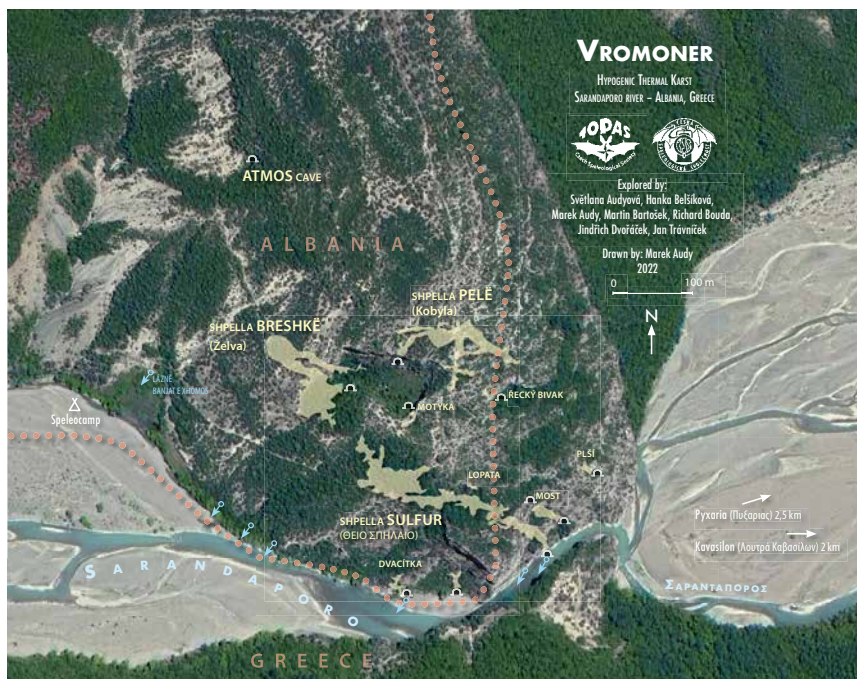


Fig. 4 Situation of hypogenic caves in the Vromoner area. The state border between Albania and Greece is marked in red.

The Sulfur Cave is the most impressive, with the largest spaces. It is traversed by a warm blue-gray stream of mineral water, issued from several springs from the limestone bottom, to a huge dome called the Vesmír Dome (Space Dome). In lower portions of the cave, the stream bifurcates into two cave passages. Most interestingly, the bifurcation occurs precisely at the place where the cave crosses the Greek/Albanian border.

Secondary fill of the Sulfur Cave is remarkable as well. Stalagmites are covered by gypsum crystals, and yellow coatings of native sulfur cover the cave walls and the ceiling along the stream. These sulfur coatings and small stalactites are well developed especially in the Sulfur Chapel, which gave the name to cave.

The slopes rising from the Sarandaporo River towards the Albanian town of Leskovik have been used as vineyards for centuries. Therefore, sulfur was mined in the past and used for sulfuration of wooden barrels. Sulfur extraction took place in the Dvacitka (Twenty) Cave and probably in the entrance tract of the Sulfur Cave as well, despite the fact that the entrance is located in Greece.

Speleogenesis of the caves at Vromoner is largely controlled by the action of hydrogen sulfide (H_2S).

H_2S is derived from sulfates, which are common in groundwater, especially where evaporation occur at a depth. When sulfates meet migrating oil and gas (mainly methane), they become reduced to H_2S .

H_2S together with residual sulfates migrates with deep groundwater towards the ground surface. Here, it meets O_2 contained in shallow groundwater and especially in air (in fractures above the water table), becomes oxidized and changes to sulfuric acid. Sulfuric acid reacts with the limestone and transforms calcite to gypsum. Gypsum falls off periodically from the cave walls, exposing fresh limestone in a repetitive process. Some H_2S becomes oxidized to native sulfur (Jagnow et al. 2000).

Water of all thermal springs at Vromoner shows a nearly identical chemical composition, indicating a single source. Concentrations of Ca and HCO_3 are relatively low, while the contents of Na, Cl, Li, F are higher than in common groundwater. H_2S contents in the water reach 40–65 mg/l. H_2S contents in cave atmosphere may reach dangerous levels especially when air temperatures in the cave are similar to outside temperatures and air exchange is of low intensity.

The South Albanian Fault with ascending thermal waters and other fluids follows the line Tomor–Qeshibesh–Bodar–Lëngaricë–Postenan–Melesin–Vromoner (Eftimi and Frashëri 2016).

Hypogene caves are likely to be located where this fault crosses the limestone outcropping on the surface. There are several such areas in southern Albania and we plan to focus our future study on them.



Fig. 5 The hypogene cave Shpella Breshkë, Albania.
(Photo by M. Audy)

Eftimi R., Frashëri A. (2016): *Ujërat Termale dhe minerale të Shqipërisë*. 1–224. Tirana.

Jagnow D. H., Hill C. A., Davis D. G., DuChene H., Cunningham K. I., Northup D. E., Queen J. M. (2000): *History of the sulfuric acid theory of speleogenesis in the Guadalupe Mountains, New Mexico*. *Journal of Cave and Karst Studies*, 62(2): 54–59.

EXPEDITIONS OF THE RACHA PROJECT TO WESTERN GEORGIA

Vratislav Ouhrabka (Caving Club Bozkov)

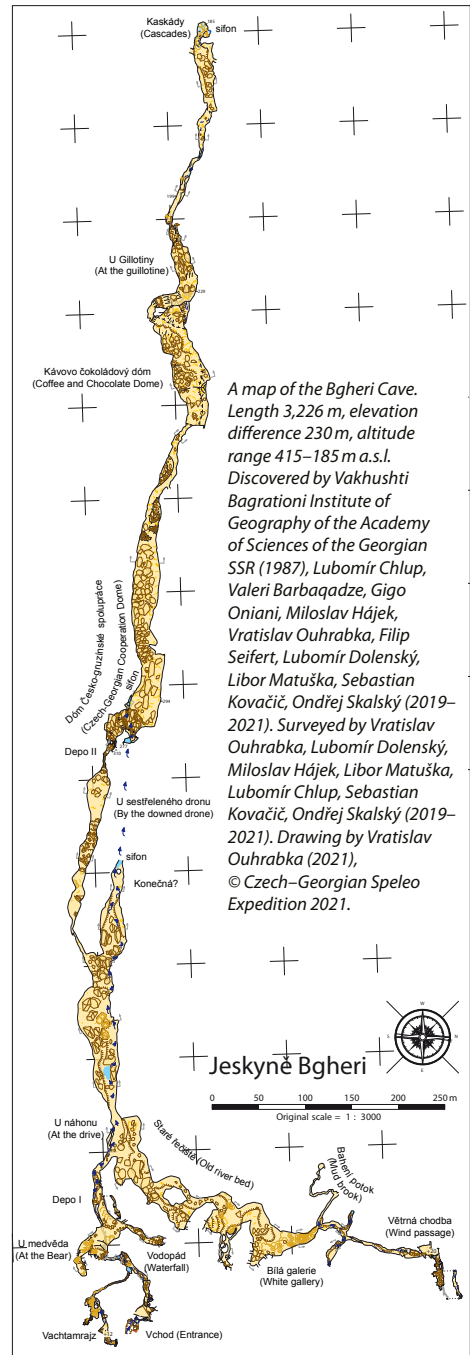
Expeditions to the karst areas of western Georgia in the Racha and Imereti regions have been organized by the Bozkov Caving Club since 2016. Exploration and documentation of the caves of Muradi and Racha 2001 are conducted in collaboration with cavers of the Georgian speleological club. In 2018, the team discovered a multi-level continuation of the Racha Cave, 930 m in length, which gives the total length of the cave of 4,070 m.

The purpose of the latest expeditions was to continue the complex documentation and the pending exploration of the ponor parts of the extensive hydrological system of the so-called Tskaltubo Cave System, which also includes the Prometheus Cave open to the public. The central part of the Sataplija–Tskaltubo karst region, lying north of the town of Kutaisi, is formed by gently folded Cretaceous limestones and dolomites. It is represented by a karst plateau, sloping gently to the south and reaching the altitude



The White Gallery in the terminal part of big domes of an old inflow branch of the cave represents one of the most beautiful places in the Bgheri Cave (Photo by O. Skalský)

of around 500 m. It is bounded by the Semi River canyon in the north and by the Kumi River valley (145 m a. s. l.) in the south. The whole region is drained through several big springs in the Kumi River basin. Expeditions in August 2019 and September 2021 were focused specifically on the exploration of the as yet poorly known, hardly accessible Bgheri Cave. The first task was to unblock and clean the entrance to the cave from driftwood and gravel, which blocked the entrance for many past years. During the two expeditions, the cave was mapped – for the first time since its discovery in the 1980s. The survey of the Bgheri Cave resulted in the discovery of a 1.3 km long continuation of the main corridor, reaching to the depth of 217 m, and several 100 m corridors in its inflow parts. The present length of the Bgheri Cave is 3,226 m. In the second ponor cave, the Melouri Cave, documentation of corridors in upper cave portions continued. As yet unknown high-positioned corridors of old evolutionary stages were discovered here. The Czech–Georgian expeditions to the Melouri Cave have documented 3,460 m of new corridors since 2016. A number of as yet unpassed portions should be explored in both caves: they may lead to discoveries of interconnections between the ponor caves on the Melouri Plateau and the spring caves in the Kumi River valley.





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