# UIS BULLETIN

Union Internationale de Spéléologie

Volume 64-1 - June 2022



## Le Bourget-du-Lac is ready to welcome you!

- A remarkable karst to be explored
- Special activities and celebrations
- 536 papers (communications and posters)
- The major event of the International Year of Caves and Karst
- The Cave Time Capsule 2091 Project – Call to All Countries

### ALSO IN THIS ISSUE

UIS BULLETIN
Official publication of the UIS for publicizing the activities of the UIS and the state of the art of international speleology - ©2022

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Founded in Postojna, Slovenia, 1965
The UIS is a non-profit, non-governmental worldwide speleological organization that promotes the development of interaction between academic and technical speleologists of a wide range of nationalities to develop and coordinate international speleology in all of its scientific, technical, cultural and economic aspects.

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**Deadline for submissions for the next issue (Nº 64-2): November 15, 2022**

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**Scientific campus of the University Savoie Mont Blanc Technolac, in Le Bourget-du-Lac, France, the venue of the 18th International Congress of Speleology -** *© Photos library of USMB*
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## ENGLISH LANGUAGE EDITOR FOR THIS ISSUE:

**Tim MOULDS** *(Australia, UIS Adjunct Secretary)*
**George VENI** *(USA, UIS President)*

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REMEMBER
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*Editorial*

# UIS BULLETIN: THE LAST FIVE YEARS AND PLANS FOR THE YEARS AHEAD

By Nivaldo Colzato (Brazil)
*UIS Adjunct Secretary / UIS Bulletin Editor*
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Dear cavers, speleologists, and cave lovers. This issue of the UIS Bulletin is the last one of the current UIS Bureau which was extended one year due to the COVID pandemic. Despite the difficulties—mainly in 2020-2021—the speleological activities didn't stop in this 5-year period.

During the pandemic, when cavers couldn't go out into the field to explore, they "discovered" in virtual activities a great opportunity to bring people together to talk about caves and karst. In addition, unlike most field activities, the virtual ones were usually recorded and made available for more people to watch at any time. These electronic tools also allowed meetings to become much more frequent than before. In this way, institutional issues also benefited.

In the field of cave science, important news and advances were also experienced, giving us many reasons to celebrate. The UIS Bulletin, within its editorial line and purpose, has followed these positive facts and has published many of them.

From issue 59-2 (December 2017) until this one, 64-1—10 issues during this current UIS Bureau term—there were 568 pages dedicated to the state of the art of speleology, to the activities and meetings of the UIS and its Bureau, reports and activities of the UIS commissions, news about the UIS congresses, alerts about caves and karst destruction, as well as other important announcements.

To provide a more pleasant and understandable reading, 743 photos and 189 images were used to illustrate the text on these 568 pages. Not considering the UIS congresses, which news are traditionally in each issue, the champion in these five years is the International Year of Caves and Karst 2021/22 (IYCK). The last six issues (this one included) highlighted the largest and most important speleological project ever, which major event will be celebrated soon during the 18th UIS congress, in France.

Although the UIS has its scientific publication—the International Journal of Speleology (IJS)— important scientific achievements were shown in the UIS Bulletin too. Among them, we had one report about volcanic caves on Earth, the Moon, and Mars, which had their size and morphology reviewed by comparative planetology and the use of thermal infrared cameras to find new caves in nearly accessible regions on Earth, and even on other planets. The second article about this project, led by the UIS Commission on Physical Chemistry and Hydrogeology of Karst, is on *page 20*.

The bulletin itself has also made progress in the last five years. On the initiative of George Veni, for instance, the President's Column was created, becoming an important channel of information where he has presented the main projects, actions, and aspirations of the UIS and its Bureau.

Regarding the quality of language, as most of the Bulletin's authors aren't native English speakers, all articles received a thorough language review by Veni or Tim Moulds (Australia, UIS Adjunct Secretary). This procedure is very important and gives the publication greater respect and credibility.

Despite improvements that are always necessary and welcome in any activity or publication, what matters most in the UIS Bulletin is its content. In this regard, although it has served its purpose correctly, we certainly can do more, and better.

As one of its purposes is to serve as a bridge between the UIS and its member countries, we hope for greater participation from them in submitting their main achievements and events.

In a few days the UIS will have a new Bureau that will run the International Union for the next three years until the 19th UIS congress in July 2025, in Brazil. New ideas and new proposals will arise, and good achievements will surely come. Our best wishes are that this new period can be as or more successful than the one that is ending.

The UIS Bulletin, however, will follow its regular trajectory initiated in 1970, and will remain ready to take the most important speleological news to the international speleological community of the more than 60 countries where it is currently sent. After all, this Bulletin is from the UIS but belongs to the whole world.

Enjoy reading this issue and please participate in future ones. We look forward to receiving your contributions.

## The President's Column

# AN ENDING AND A BEGINNING

By Dr. George Veni (USA)
*UIS President*
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This is my last President's Column. After 5 years it is time for me to retire from this position and support the next set of leaders who will be elected to the UIS Bureau at the International Congress of Speleology. As a Past President, I will continue to advise and assist wherever possible. The UIS is an incredible organization. It has grown during my time in office and will soon grow even further—and that begins with you.

We speak of the UIS as an entity, but it is really a collection of people. Its success is because of what you do. I ask and hope that you will become active in the UIS and continue its growth and success far into the future. Please work with and support your local, regional, and national speleological organizations. That is vital. But also consider working with a UIS Commission or running for election to the UIS Bureau at the International Congress. If you are not sure what you can do to help, ask! If you have ideas for how you can help, tell us!

I hope you will attend the International Congress of Speleology on 24-31 July 2022. It is the best place to join commissions, meet with the Bureau, and learn about the UIS. The General Assembly meets twice, at the start and end of each congress. That is where the business of the UIS occurs. Everyone is welcome to attend the General Assemblies. By seeing what the UIS is doing and how it works, you may have ideas on other things UIS could do and how UIS can improve.


*UIS members met with governmental leaders at UNESCO on 13 September 2021 to celebrate the International Year of Caves and Karst. The UIS asks you to become the future leaders of speleology and continue our successes and grow our influence in the years ahead.*

The International Congress will also be the major event of the International Year of Caves and Karst. There will be a closing of the International Year at the end of the Congress, but this is only ceremonial. The International Year will continue through the end of 2022. I have no doubt the Congress will energize you to organize more activities through December 31st. See my report on the next page for ideas and updates for the International Year.

Remember, post the results of all your International Year events to the website. If is easy and should not take more than 5 minutes. Creating this record of events is critically important. At the end of the year, I will summarize all events into a report that when published, will be available to you and everyone to prove the global value and support for caves and karst, and help you find funding and support for more exploration, research, and protection.

The most important thing to remember is that together we do great things. We have reached tens of millions of people with the International Year, including an unprecedented celebration at UNESCO to governmental leaders from many nations. We have lived the motto of the International Year, *"Explore, Understand, Protect,"* by pushing to incredible extremes around the planet, making important discoveries to benefit humanity, and using those accomplishments to protect our environment through the creation of new World Heritage Sites, Global Geoparks, and other protected areas, and through better education and regulations.

Don't ever forget the strength represented in our name:

- **International:** ***Everyone***
- **Union:** ***Working together***
- **of Speleology:** ***For speleology***

And don't think of my retirement as an ending, but a new beginning. As I watch you move ahead in your next steps to advance speleology, I thank you for all you have done for speleology, and for all you will continue to do in the years ahead.

It has been a great honor to serve you.

Union Internationale de Spéléologie


Fédération Française de Spéléologie

## Hello to cavers, scientists, and all karst lovers,

The 18th International Congress of Speleology (ICS) will start in a few days. After five years of preparation, we are almost there.

At this moment, more than 1,200 cavers and speleologists from the five continents are preparing their belongs to land in Le Bourget-du-Lac.

The International Union of Speleology and the French Federation of Speleology wish all of you a nice and safe trip to France. We are looking forward to welcoming you.

The site of the event, at the University of Savoy Mont Blanc-Chambery, is ready to provide the best facilities for a successful event, and all of us in the 18th ICS Organizing Committee are still working hard for you and companions to have unforgettable moments during your stay in our country.

The scientific conference, the videos, the bookshops, the stands, the equipped caves, the Bauges massif with remarkable karst—labeled a UNESCO World Geopark—as well as the beaches of the *Lac du Bourget*, the largest natural lake in France, everything is there just waiting for you!

If you aren't registered yet, there is still time. All the information you need is on the website: https://uis2021.speleos.fr/

See you soon.

*18th ICS Organizing Committee*

# THE CAVE TIME CAPSULE 2091 PROJECT

## *Call to all countries*

By Stéphane Jaillet (France)
*Université Savoie Mont Blanc, CNRS*
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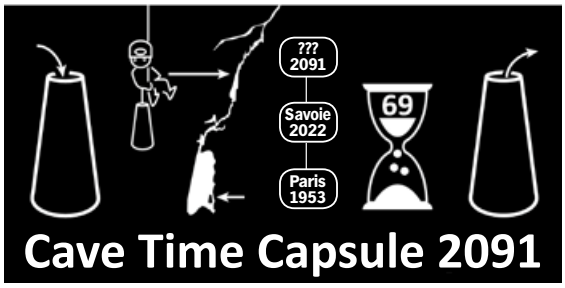
The **"Cave Time Capsule 2091"** project proposes to prepare a time capsule for the 18th International Congress of Speleology which will take place in Savoie in July 2022. Whilst the present time seems to pass faster each year and time escapes us, we are aware that caves themselves are time capsules of the past, we propose a project where each country can send an object into the future. It will be kept in France, in a cave in Savoie.

This time capsule will be sealed during the 18th International Congress of Speleology and we will preserve it for a period of 69 years. This duration is chosen symbolically to symmetrically match the period from the first international speleological congress, in Paris in 1953 to now. It will be a gift from the cavers of the present to the cavers of the future.

This project is part of the International Year of Caves and Karst IYCK2021. From a practical point of view, the capsule will be a stainless-steel box with a volume of about 60 to 80 litres. It will be sealed in a prestigious cave in Savoie: the Fitoja chamber at a depth of 200 m. The time capsule CTC2091 is placed under the moral patronage of Christian Dodelin who died in 2021. He was a very appreciated caver in Savoie, in France and around the world.




*The wall of the Fitoja chamber, chosen for the time capsule.*

What will our children and grandchildren see in 69 years when they open such a capsule? What emotion will they feel in 2091 when they discover the objects we buried in 2022? What choice will we make about the objects we deliver to the future?

Each UIS member country, a few lucky participants and a few prestigious partners will have the opportunity to fill this capsule and pass on these objects of our present to the future. The volume of each object is limited to about 0.5 l. A guestbook will be open to all participants of the congress who will be able to send a note in the future... in 2091...

We call here on each country to prepare an object related to caving.

It should be a reasonable size (0.5 l) and not perishable. To participate, you just have to register your object by sending an email and if possible a photo of the object. The list of objects will not be published, but we will register them in a list to ensure that they are the right size and fit for the project.

The objects will be placed in the capsule during the 18th International Congress of Speleology. The capsule will be closed during the congress and taken down a few days after the congress.

**For more information:** Click here.
**Contact:** jaillet.speleo+CTC2091@gmail.com


*Location of the time capsule in the Fitoja chamber (Bauges, Savoie, France)*

# The Closing Months of the INTERNATIONAL YEAR OF CAVES AND KARST 2021/22

## *Let's finish spectacularly!*

By Dr. George Veni (USA)
*UIS President*
gveni@nckri.org

The COVID-19 pandemic made the International Year of Caves and Karst a challenging period to reach and teach the world about the importance of caves and karst, but we have succeeded. As I write this report in early July 2022, we have 262 partner organizations in 51 countries, and together we have organized 644 events. This is excellent and beyond most expectations. Congratulations to all of us!

To close the International Year, I call on all of you to use the last 6 months of 2022 and finish the year with more events and outreach to the public. Let us end the year in spectacular fashion so people will remember the great value of caves and karst long after the International Year is over. To meet that goal, I present this list of information and ideas to help you.

• Remember, the "closing" of the International Year at the International Congress of Speleology is only ceremonial. Please continue organizing events and using the logo until 31 December.

• Go to the Download page of the International Year website to download and use all the materials available. Use them freely. You do not need special permission.

• Read the Planning Guide (available in 11 languages) for ideas on events and activities.

• Read the Planning Guide for Virtual Activities because to reach the maximum number of people, we need to make as many events as possible virtual or hybrid.

• The second half of the year has many holidays. Organize International Year events and parties around those holidays, including the last day of the year. Give people, who normally don't think about caves, gifts to remind them about the importance of caves and karst.

• Revisit the plans you had for in-person events before the pandemic, and if it safe, organize them this year.

• Most ideas are in the planning guides, and I will not repeat them except for one. Invite the news media to your events. Make them your voice to reach the thousands to millions of people who will not be at your event.

*Volunteers celebrating the International Year and Earth Day by cleaning trash from a cave entrance in New Mexico, USA.*

• Join me in reaching the goal of having organized over 730 events by the end of 2022. We are most of the way to that goal. By reaching it we will be able to show the world our enthusiasm and that we organized an average of one event for each day of the 2-year International Year!

After each event, send a report to Jasmina Rijavec, our fabulous website manager, to post on the website. Unless we record your events, we can't use them after the International Year to continue supporting caves and karst. It is easy to do and takes less than 5 minutes by using the simple format on the website:

• Location:
• Date:
• Event name:
• Event description:
• Event report: *[usually one or more simple links to websites, social media, and/or news media reports]*

I know some of you have already organized events but haven't sent in reports. Please send them now to Jasmina so we can record and count them. This is especially true for those of you with events that continue over weeks or months. Each lecture or separate activity in your program is an event that should be listed on the website.

Lastly, do not be limited to my ideas. Explore other possibilities. Do what will work best in your country, culture, and community. The most important thing is to connect with the public in your area about our planet's splendid caves and karst areas.


*Training course for teachers in Spain included topics like "Sensitivity and protection of Caves and Karst". Practical sessions were in the Cave los Mármoles and in the Chasm Fuente del Francés.*

## Some activities around the world on behalf of the International Year of Caves and Karst 2021/22. For more information, click on the image.


*LA SALAMANCA CAVE: Campaign to recognize the environmental status of caves on the coast of the Parana River, in San Pedro, Argentina.*


*Cave Restoration Workshop – Graffiti Cleaning, in Croatia.*


*Caving introduction to the local scouts club of Evosmos-Thessaloniki, Greece.*


*Doors Open Day in the Holstejnska Cave, Czech Republic.*

EVENTS

# 36th BRAZILIAN CONGRESS OF SPELEOLOGY

## Event dedicated to the INTERNATIONAL YEAR OF CAVES AND KARST 2021/22

By José Ayrton Labegalini (Brazil)
*UIS Past President*
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The 36th Brazilian Congress of Speleology (CBE, from *Congresso Brasileiro de Espeleologia*, in Portuguese) was held between 20-23 April 2022 with the presence of 284 participants. Planned to be in June 2021, this main speleological event in Brazil, like many others around the world, was postponed due to the COVID-19 pandemic.

The organization was carried out by three speleo-teams (Brasília, GREGEO UnB, and Pequi) ) members of the Brazilian Speleological Society (SBE). The venue was Ulisses Guimarães Convention Center, in Brasilia, which was the same place that held the SPELEO-BRAZIL 2001, the 13th International Congress of Speleology (ICS) in 2001.

The pre-congress activities were carried out from 16-20 April with four mini-courses covering themes of photography, topography, licensing, and biology, as well as five field trips to caves near the Federal District. The 36th CBE also involved 11 sponsoring institutions and 13 supporters, bringing great positive repercussions in the speleological field.

For the technical-scientific program, 78 papers were presented at the congress, covering eight thematic areas, and culminating in 36 oral presentations and 42 presentations in poster format.

The 36th CBE also had guest speakers, national and international leaders who are experts in their thematic areas, contests with 67 photographs and 14 cave maps, and the Michel Le Bret and Academic Awards, which were introduced for the first time in a Brazilian speleological congress. Due to the great success achieved, both awards will be part of future CBEs.

Another important content of the event was the six Round Tables which addressed the following topics:

- Evolution of Technologies applied to Physical Environmental Studies.
- Transdisciplinarity and Advances in Speleological Research.
- Monitoring and Impact Assessment of Speleological Heritage.
- Evolution of Technologies Applied to the Study of Biotic Environments.
- Speleological Heritage Conservation: Advances and New Challenges.
- Speleology in Latin America and the Caribbean: Past, Present, and Future.

© HTTP://36CBE.ORG.BR/LOCAL/

*Ulisses Guimarães Convention Center, in Brasília-DF—venue of the 13th International Congress of Speleology in 2001—was the place of the 36th CBE.*

Also, as part of the program, several special lectures enhanced the event:

- **Cave Qualification Mechanism for Educational Use and Scientific Dissemination,** *by Daniel Menin.*
- **Caves as Geological Heritage and Geotouristic Uses,** *by Paulo Cesar Boggiani (USP).*
- **Women in Brazilian Speleology: from Historical Challenges and Current Panorama to Future Perspectives,** *by Lorena Oliveira Pires (SEE).*
- **Brazilian Underground Biodiversity: Current Knowledge and Perspectives,** *by Rodrigo Lopes Ferreira (CEBS/UFLA).*
- **Exploring Brazilian Karst: Perspectives of Relevant Discoveries Across the Country,** *by Leda Zogbi (Meandros Speleo Team).*
- **Espeleo Inclusion: Studies of Parks and Caves for Accessibility,** *by Érica Nunes (SBE).*

The high point of the first day of the 36th CBE, which was expected by all participants, was the opening speech that took place on the night of the 20th: ***"International Year of Caves and Karst 2021/22: the UIS, the Project, Achievements, and Legacy"*** presented by Nivaldo Colzato, UIS Adjunct Secretary.

The didactic used by Nivaldo was perfect, where he explained the organization of international speleology, which starts with the caver/speleologist, and then passing up through the organized speleo teams (EGMS, EGB…), national organizations (SBE, NSS, SSI…), international regional organizations (FEALC, FSE…), until arriving at the International Union of Speleology, the UIS.

© 36th CBE

**Members of the 36th Brazilian Congress of Speleology (CBE) Organizing Committee during the opening ceremony.**
**Left to right:** *Allan Calux (*Comunication Committee Coordinator*), Jocy Brandão Cruz (*Coordinator of the Brazilian National Center for Research and Conservation of Caves (ICMBio/CECAV*), Paulo Arenas (*36th CBE President*), Roberto Cassimiro (*current SBE President*), and Renata Santos Momoli (*Scientific Committee Coordinator*).*


NIVALDO COLZATO

**Left to right:** *Efrain Mercado (Puerto Rico, UIS Vice President of Operations, standing), Juan Montaño Hirose (Mexico), and José Palacios Vargas (Mexico), during the Round Table dedicated to Latin America and the Caribbean speleology.*

© 36th CBE

*Nivaldo Colzato (UIS Adjunct Secretary), during his presentation at the opening ceremony of the 36th Brazilian Congress of Speleology.*


© 36th CBE

*Erica Nunes (GESMAR/SBE) talking about "Speleo Inclusion: Study of Parks and Caves for Accessibility".*


© NIVALDO COLZATO

*Nivaldo Colzato (left) and José Ayrton beside the UIS poster, which promoted the organization.*


JOSÉ AYRTON LABEGALINI

*Nivaldo Colzato (left) and Efraín Mercado with the IYCK poster.*

The next step in the presentation was to show what is the UIS, since its foundation in 1965 until the organization of the next International Congress of Speleology (ICS), when he invited the public to attend the 18th ICS in Savoie, Mont Blanc, France (July 24-31, 2022) and introduced the 19th ICS in Belo Horizonte, Brazil (July 25-31, 2025). Afterward, he presented the International Year of Caves and Karst 2021/22 (IYCK), the theme of the 36th CBE, as the most important event in the history of the UIS and the biggest and most significant speleology event of all time. In a chronological way, he traveled from the initial idea back in 2015, passing through the main events already carried out around the world, to the date of his presentation.

Regarding the UIS' direct actions in the IYCK, the audience was shown promotional materials, posters, leaflets in several languages, and both planning guides specially produced to help the international speleological community properly organize activities on behalf of the IYCK. The hard and long work dedicated to the special ceremony at the UNESCO Headquarters, in September 2021, in Paris, was also highlighted.

When presenting the updated statistics of the achievements on behalf of the IYCK around the world—454 in 36 countries—Nivaldo pointed out that many UIS members were missing from the list, probably because many people still don't fully understand the whole importance of the IYCK.

Beyond promoting caves and karst, this UIS project should be understood, for instance, as a special and probably the greatest opportunity ever to strengthen the speleological institutions and also in the approval of laws for the protection of karst heritage.

The last act of the presentation was the video of the IYCK, which was very much appreciated by the audience. Link to access: https://www.youtube.com/watch?v=sw1YOSNXSvs.

The whole Opening Ceremony of the 36º CBE is at https://www.youtube.com/watch?v=EBS95Tdgv78.

In addition to the plenary lecture presented by Nivaldo, the UIS was also present at the 36th CBE through two specially prepared posters, which were displayed at the entrance hall of the convention center. One had institutional information about the UIS and the other provided information about the IYCK.

It was impressive and gratifying to see the positive response to the UIS, the exposition of these posters, and mainly to Nivaldo's opening speech. All the UIS representatives who attended the 36th CBE were sought by the attendees for more details about the organization. Besides Nivaldo, these representatives were Efraín Mercado (*Puerto Rico, Vice President of Operations*), José Ayrton Labegalini (*Brazil, past President*), and José Palacios Vargas (*Mexico, past Adjunct Secretary 1993-1997*).

This way of UIS participation in a national event of speleology, as was done in the 36th CBE, is very productive and important to promote the organization, and is put here as a suggestion to be followed by all UIS Bureau members, current or past ones, to do the same in their respective national congresses, symposia, courses, or meetings. At least in Brazil, there is a consensus for this procedure to become traditional in the official SBE events.

The next CBE will be held in Curitiba-PR, in the South of Brazil, in July 26-29, 2023. The UIS, of course, will be given special attention. After all, the organizers expect to welcome the UIS Bureau members for its annual meeting, who will be in Brazil to check the venue and the organization of the 19th ICS (Belo Horizonte-MG, 2025).

Counting on the support and presence of the UIS, the 37th CBE will certainly be one more memorable Brazilian speleological event!

UIS CONGRESSES

# COUNTRY DELEGATIONS AT THE UIS CONGRESSES: A BRIEF RETROSPECTIVE

***For the first time in the UIS history, one country's delegation will attend an International Congress of Speleology as official organizer of the next congress instead of as candidate.***

By José Ayrton Labegalini (Brazil)
*UIS Past President*
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Nivaldo Colzato (Brazil)
*Adjunct Secretary of the UIS/UIS Bulletin Editor*
*19th ICS Representative at the UIS*
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The International Congress of Speleology (ICS) has been scheduled every four years since 1953 (Paris, France), before the foundation of the International Union of Speleology (UIS) itself. However, the 2nd ICS (Bari, Lecce, and Salerno, Italy) was organized not in 1957 but one year later, in 1958. Since the foundation of the UIS in 1965, during the 4th ICS (Postojna and Ljubljana, Yugoslavia), only the 9th congress (Barcelona, Spain) was postponed from 1985 to 1986. Since then, the quadrennial frequency has been maintained for more than three decades, until after the 17th ICS in 2017 (Sydney, Australia). As a consequence of the COVID-19 pandemic, the 18th ICS was postponed one year, from 2021 to 24-31 July 2022.

It is normal in these congresses that citizens from the same country gather in entourages, whether to travel together, for joint participation in common activities, or for the presentation of a proposal or defense of a point of view. When an entourage, or part of it, organizes itself to present a proposal, such a group becomes a delegation. Delegations are always organized at the ICSs.

For this 18th ICS, which will also be the major event of the International Year of Caves and Karst 2021/22, more than sixty countries—most of them members of the UIS—are expected to organize their entourages as delegations. Brazil will likely send its largest delegation to an ICS (except, of course, the SPELEO-BRAZIL ICS in 2001).

One type of delegation always present and active in the ICSs are those that go to promote and defend their country's proposal to organize the next congress. In 1993, at the 11th ICS (Beijing, China), the Brazilian entourage, without any previous plan and during the event itself, organized itself into a delegation to propose the organization of the 12th ICS; on that occasion, we ended up withdrawing our proposal in favor of the Cuban delegation, which lost the election to the Swiss proposal. In 1997, at the 12th ICS (La Chaux-des-Fonds, Switzerland) the Brazilians there joined in a delegation to defend the proposal to organize the 13th ICS. As a result of a tight competition, four years later the international speleological community was gathered in Brasília for SPELO-BRAZIL-2001, where the numerous French delegation—although well prepared and holding a good proposal for the 14th ICS (2005) —lost the election to the small Greek one.

In the following ICSs, the respective delegations of the United States, Czech Republic, Australia, and France, presented unique proposals for the organization of the 15th ICS in 2009 (Kerrville, USA), 16th ICS in 2013 (Brno, Czech Republic), 17th ICS in 2017 (Sydney, Australia), and 18th ICS in 2021 (Lyon, later changed to Le Bourget-du-Lac, France), which was postponed to 2022.

At the UIS Bureau annual meeting in 2018 (Ebensee, Austria) three countries expressed interest in organizing the 19th ICS in 2025: Brazil, China, and Mexico. In 2019, China and Mexico withdrew their candidacy due to different reasons. In 2020, the Brazilian representatives in the UIS Bureau (Nivaldo Colzato as Adjunct Secretary and José Ayrton Labegalini as Past President) were requested not to let Brazil withdraw too. After consulting Allan Silas Calux, at that time President of the Brazilian Speleological Society, the proposal was maintained, making Brazil the only candidate.


*Sign of the 19th ICS stand at the 18th ICS in Le Bourget-du-Lac, France, where Brazilian will welcome participants with gifts and information about the nex UIS contgress in 2025.*

However, the proposal had to be approved by the UIS General Assembly (GA). Considering the one-year postponement of the 18th ICS, the UIS Bureau was asked to call an extraordinary GA in 2021 where the delegates were asked to approve Brazil, giving us four years to properly organize the event, as usual. As a result of that GA, the Brazilian proposal was unanimously accepted by the 35 delegates who voted, therefore, for the first time in the history of the UIS, one of its congresses was selected virtually.

Also, for the first time we will have a delegation, in this case the Brazilian one, going to an ICS, neither to defend its proposal for the organization of the next ICS nor to compete with another country, but to present the state of the art of the event's organization, which is already under its responsibility.

Whereas there is the tranquility of not having to convince the delegates to vote for its proposal, on the other hand, there is the responsibility to convince not only the delegates but all participants of the 18th ICS that the Brazilian proposal for the 19th ICS is strong and attractive, so they will decide to go to Brazil in 2025, where we look forward to welcoming a large international representation.

Considering the importance of providing a beautiful promotion of the 19th ICS in Le Bourget-du-Lac, the Brazilian Speleological Society, in partnership with the Brazilian National Center for Research and Conservation of Caves (ICMBio/CECAV, co-organizer of the event), have prepared a series of promotional materials to deliver to the participants, as well as special activities and meetings at our two stands, which were kindly offered by the Organizing Committee.

Besides the leaflets, gifts, banners, flags, stickers, and movies that will be given away at our stands, the most important and appreciable "product" we will offer to the visitors will be the well-known sympathy, friendship, and hospitality of the Brazilian people.

So, dear participants of the 18th ICS, please first enjoy the 18th ICS itself. When you have some free time, you are welcome at our stands, where you will be provided all the information you need to plan your trip to Brazil in 2025.

The stands will be located just in front of the UIS stand, in the Sports Hall Émile Allais.

**STATISTICAL DATA OF THE INTERNATIONAL CONGRESSES OF SPELEOLOGY**

| ISSUE | YEAR | COUNTRY | CITY | PARTICIPANTS | COUNTRIES | PAPERS |
|---|---|---|---|---|---|---|
| 1 | 1953 | France | Paris | 226 | 29 | 130 |
| 2 | 1958 | Italy | Bari, Lecce and Salerno | 217 | 28 | 115 |
| 3 | 1961 | Austria | Vienna, Obertraun and Salzburg | 223 | 28 | 113 |
| 4 | 1965 | Yugoslavia | Postojna and Ljubljana | 366 | 26 | 193 |
| 5 | 1969 | Germany | Stuttgart | 350 | 24 | 212 |
| 6 | 1973 | Czechoslovakia | Olomouc | 765 | 40 | 348 |
| 7 | 1977 | Great Britain | Sheffield | 391 | 39 | 192 |
| 8 | 1981 | United States of America | Bowling Green | 1,093 | 40 | 318 |
| 9 | 1986 | Spain | Barcelona | 389 | 33 | 259 |
| 10 | 1989 | Hungary | Budapest | 724 | 38 | 456 |
| 11 | 1993 | China | Beijing | 235 | 34 | 120 |
| 12 | 1997 | Switzerland | La Chaux-de-Fonds | 1,763 | 52 | 907 |
| 13 | 2001 | Brazil | Brasilia | 568 | 46 | 230 |
| 14 | 2005 | Greece | Kalamos | 539 | 51 | 289 |
| 15 | 2009 | United States of America | Kerrville | 1,567 | 56 | 540 |
| 16 | 2013 | Czech Republic | Brno | 1,007 | 63 | 314 |
| 17 | 2017 | Australia | Sydney | 462 | 42 | 293 |
| 18 | 2021 | France | Le Bourget-du-Lac | more than 1,200 | at least 50 | 536 |
| 19 | 2025 | Brazil | Belo Horizonte | | | |



**Complete list of the International Congresses of Speleology (ICS):** *Only three postponements so far (2nd, 9th, and the 18th).*

NEW UIS PROJECT

# CAVE DATA SHARING GUIDELINES

## *Invitation for contribution*

By Peter Matthews (Australia)
*President UIS Informatics Commission (UISIC)*
matthews@melbpc.org.au

One of the core aims of UIS is to encourage responsible cave and karst data sharing for the advancement of speleology. This is a tricky issue where we have conflicting aims of sharing data but at the same time protecting the location and data of sensitive caves.

Therefore UIS has set up a project to establish and publish a new document, the ***"UIS guidelines for responsible cave data sharing"***, particularly in view of the current work relating to this topic. The project's leader is Jill Rowling of Australia (jillr@speleonics.com.au). **It is important that these guidelines accommodate the policies of each country, therefore each country should consider contributing to and influencing the final document**.

Anyone interested can contribute. The discussions and work will proceed via a UIS forum and web page. You can join the project at: https://www.uisic.uis-speleo.org/forum/viewforum.php?f=8. The project plans to consider all aspects of this complex issue including recommended existing techniques for effective data sharing, and of course methods for sharing data without revealing exact locations. By having specific methods and recommendations formally available, it is hoped that more organisations will be willing to share their data for the advancement of speleology.

Related current work driving the need for these guidelines includes (1) *KarstLink*, a W3C Linked Data protocol for linking independent databases, (2) the GrottoCenter web-based global cave database since 2008 has received a UIS grant to allow graded data protection for any sensitive caves that are already or will be in its database, and (3) the extra cave inventorying required to assist the anticipated UIS push for greater UNESCO cave and karst protection, as per the International Year of Caves and Karst (IYCK/UNESCO) presentation in 2021.

GrottoCenter has also sent a letter inviting countries to advise them of any existing data protection policies that they may already have that can be applied immediately to the GrottoCenter database. They have a forum to discuss the details at: https://www.uisic.uis-speleo.org/forum/viewforum.php?f=10.

But please, do ask your organisation to think about under what conditions they would be prepared to share their data, and then contribute to the Guidelines accordingly.

### Links:

**KarstLink:** https://uisic.uis-speleo.org/exchange/karstlink/index-en.html

**GrottoCenter:** https://uisic.uis-speleo.org/wikicaves

**UISIC:** https://uisic.uis-speleo.org

## THE UIS INFORMATICS COMMISSION

The aim of the UIS Informatics Commission (UISIC) is to encourage and facilitate the systematic collection and responsible use of cave, karst and related data on an international basis. Formed in 1986 at the 9th International Congress of Speleology, UISIC is a Commission of the Union Internationale de Spéléologie / International Union of Speleology (UIS).

The work of the Commission is carried out either in Sub-commissions or in Projects: Sub-commissions for where there is an ongoing role, and Projects for finite tasks which will eventually be completed. These replace UISIC's earlier Working Groups to better fit with the UIS structure changes of 2017.

See our complete structure accessing https://www.uisic.uis-speleo.org/

REPORT OF ACTIVITIES 2018-2022

# MATERIALS AND TECHNIQUES COMMISSION

By Monica Ponce (Mexico)
*President*
espeleocoahuila@gmail.com

The UIS Commission on Materials and Techniques has been active in several ways over the past five years. There is broad interest in the work of the Commission, but more help is needed.

The President wants to continue her role in the Commission and obtain new members starting with the International Congress of Speleology in July 2022. One of our major needs are coordinators for European and Asian cavers to help us build connections in those countries.

Following is a list of some of our projects since 2018.

## INAH-Coahuila

In 2021, the *Instituto Nacional de Antropología e Historia (INAH)* of Coahuila, Mexico, asked the Commission to evaluate and write a report on the equipment used by looters in mortuary caves.


*Candelaria mortuary cave in Coahuila, Mexico.*

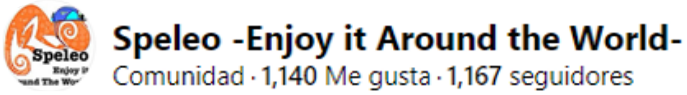
## Logo of Materials and Techniques Commission

We created a logo and decided to use a salamander as our mascot. See below:

## Facebook

The Commission's Facebook page is doing well with 1,174 followers (24% women and 76% men) from Argentina, Austria, Belgium, Brazil, Bulgaria, Canada, Colombia, Croatia, Czech Republic, France, Germany, Greece, Hungary, India, Indonesia, Iran, Lebanon, Malaysia, Mexico, Morocco, Poland, Portugal, Puerto Rico, Romania, Russia, Serbia, Slovenia, Spain, Tunisia, Turkey, Ukraine, United Kingdom, and the United States.

Click on the image below to access the Commission's Facebook.




## Meetings

In 2019-2021, the Commission hosted meetings between cavers and climbers about the different types of equipment they use and the history of its evolution. This included a review of changes in caving equipment from 2017-2021 through social media to find models and examples, and to share that information in videos, interviews, photographs, and to publish it on the Commission's Facebook page.

## Speleological Anecdote Project: Digital

The Commission started the "Speleological Anecdote" project where it collects and preserves interviews and information about speleological materials and techniques. The interviews last up to 35 minutes and are conducted by Zoom, which allows easy recording and sharing of the interviews on the Internet.

To date, the Commission interviewed cavers in Mexico, the United Kingdom, and the United States, and contacted cavers in Argentina, Brazil, Costa Rica, Cuba, Italy, and Spain. Interview topics include:

*a) Personal equipment*
*b) Clothing*
*c) Lighting*
*d) Exploration techniques in humid, hot, cold, icy, volcanic and gypsum caves, and old mines and modern mines*
*e) Scientific and sport disciplines*

*f) Restoration and cleaning of speleothems*
*g) Underground surveying*
*h) Underground photography and special effects*
*i) Progression of anchors*
*j) Cave rescue, including self-rescue*
*k) Personal and collective equipment*
*l) Logistics and administration of exploration*
*m) Food*
*n) Speleotourism*
*o) Use of drones*

We want to recover in the history of expeditions involved in the modifications and creation of teams to solve special situations in exploration. We plan to do this through interviews with renowned cavers as well as with any person who has had to solve an emerging situation in their activity. So far, we have conducted two interviews in Spanish, but we can add English subtitles to the videos:

• We started the project with Antonio Llufriu from England who explores 15th Century mines with his group "C9C Underground Explorers," who are photographers and vastly experienced.

• Later we interviewed Francesco Lo Mastro (former President of the Italian Group *Associazione per L'esplorazione Geografica La Venta*). We talked about Naica Cave (Mexico) expeditions and all the new products they had to create for the extreme conditions of this hot cave.

With the money we saved from a grant by the UIS to the Commission, we want to buy the Zoom applications to conduct remote interviews. Antonio Llufriu will help us with interviews in English. Then we will create a YouTube channel for the Commission and publish our interviews on international social networks where it is easier to reach people in all countries.

## Courses of Speleology

The Commission supported the International Year of Caves and Karst in collaboration with the Mexican Federation of Underwater Activities by creating the first online course and face-to-face course for a speleology certification during Pandemic times in 2020-2021.


## Speleological Anecdote Project: Written

On 29 August 2021, we started to receive written information from Cuban cavers for our Speleological Anecdote Project. We talked about a modification of carbide lamps and started to make a translation. We are waiting for pictures to illustrate the process, and also information on a descender they created 25 years ago named "little bear."

One Mexican caver is creating a new multi-plate for anchors and he is working to register the invention and obtain a patent.

We started sending questionnaires to cavers about their expeditions. The questions are aimed at obtaining information on products that they have modified to solve emerging situations in their cave projects.

## Exposition at the Mexican National Congress of Speleology

On 7 February 2019, the Commission presented a poster about its work at the Mexican National Congress of Speleology, in Hermosillo, Sonora, Mexico, to explain its purpose and projects and to invite people to participate. This event included the presence of George Veni *(USA, UIS President)* and Efraín Mercado *(Puerto Rico, UIS Vice-President of Operations)*.

**Left to right: Efraín Mercado** *(Puerto Rico, UIS Vice-President of Operations),* **Monica Ponce**, and **George Veni** *(USA, UIS President).*

## Bibliographic Research

On 18 September 2019, we started to review caver magazines, books, expedition reports, and other published materials, to find and compile information that offer many advantages and creative ideas for caving. This project requires more time and people.

## Graphic Guide for the International Year of Caves and Karst

The Commission supported the International Year of Caves and Karst 2021 by creating a graphic guide on how cavers can create and organize events for the International Year and share it with Latin American caving groups through different social media networks.

## Media Interviews

The Commission President was interviewed on Mexican News Channel Television Noti7 about the importance of the Commission and the UIS and the International Year of Caves and Karst.

## Speleotech IT Project

Unfortunately, the Commission's Information Technology project has failed. The purpose was to create a database that contain all the discoveries, modifications, designs, creations, and innovations that have been made around the world on the materials and techniques used in speleology.

The problem is that most cavers do not keep information regarding these details. As a result, little information was found. Additionally, messages were sent to cavers and researchers, but few replied.

## Commission Newsletter

Unfortunately, the Commission's newsletter project, UIS-SpeleoTech, has failed too. The purpose was to create a digital newsletter with modifications, designs, creations, and innovations that have been made around the world to the materials and techniques used in speleology. The problem was we did not receive answers from cavers we contacted for information.

## Web Site UIS Mattech.org

Following the International Congress of Speleology in 2017, the Commission asked for and received funds from the UIS to develop the commission's website. This project was completed with the assistance of students from the Institute of Technology in Saltillo, Mexico.

Thanks to the students, enough money was saved to renew the domain's registration a few years later, but it was unfortunately needed to repair some website problems.

We planned to publish the interviews described above in our website, but instead of renewing the website's domain, we decided to create a new YouTube channel and buy a Zoom subscription to record the video interviews remotely and with better quality. This way we can share videos on YouTube and reach more people on social networks who want to share their experiences with us.

## Collaboration with *Federación Mexicana de Actividades Subacuáticas*

We are planning a collaboration with the *Federacion Mexicana de Actividades Subacuaticas (FMAS)* to organize a cave rescue workshop and celebration on 9-15 October 2022 in partnership with the *Escuela Latinoamericana de Espeleo Socorro (ELE),* the Latin America and the Caribbean Speleological Federation (FEALC), and others in Bustamante, Nuevo León, Mexico.

For more information, contact *comisionnaldees-peleologia@gmail.com*.

## Current members and Partners of the UIS Commission on Materials and Techniques

• ***Javier Yraola Rodríguez*** from Facultad de Geografía, Universidad de La Habana, Cuba, is also President of Grupo Espeleológico Ariguanabo. He coordinates information from Cuban cavers and interviews older cavers with whom it is difficult to make a video. He arranges and sends the information in documents and pictures.

• The Commission is working with cave rescuers in Cuba on the type of equipment they use. This new project is in progress, we have contact with cavers ***Javier Yraola Rodriguez*** and ***Haydée González Pombal***.

• ***Antonio Llufriu***, President of C9C Underground Explorers from England, helps us with spectacular pictures of caves and mines and coordinates interviews in English.

• ***Aquetzalli Rivera***, Secretary from *Asociación Coahuilense de Espeleología (ACEAC)*, and ***Silvino Hernández***, President of ACEAC, are helping with scientific reports.

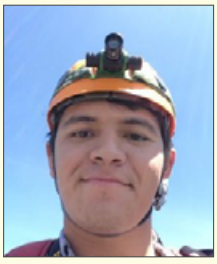
• Some students from ACEAC and the caving certification class by the Mexican Federation of Underwater Activities (FMAS), like ***Hugo Vázquez***, have begun to help with some tasks.

**Javier Yraola** (Cuba)

**Haydée González** Pombal (Cuba)

**Antonio Llufriu** (C9C Underground Explorers, England)

**Aquetzalli N. Rivera** (ACEAC, Mexico)



**Silvino Hernández** (President ACEAC, Mexico)

**Hugo Vázquez** (FMAS, Mexico)

## REPORT OF ACTIVITIES 2017-2022 / *RAPPORT D'ACTIVITÉ 2017-2022*

# CAVE DIVING COMMISSION

By Maxime De Gianpietro (Switzerland)
*President UIS Cave Diving Commission*
maxxxime@bluewin.ch

Since the last UIS Congress in Australia in 2017, the Cave Diving Commission has continued its mission to serve cave divers from around the world, as well as the various national commissions. As a facilitator of cave diving education and exploration, our commission has the role of intermediary. In fact, it is not a commission that issues or dictates regulations and norms, that is the responsibility of the national organisations, but it is an advisory commission that focuses mainly on supporting the training of UIS members in cave diving and facilitating exploration in areas not covered by national cave diving commissions.

It was for this reason that contact was extensive with cave divers from most continents looking for adequate training, as well as with national commissions seeking to establish or modernize their structures. Throughout these past years many fruitful exchanges were held with the Rescue Commission including in person with the late Christian Dodelin.

We recall that as a result of the Kerville Congress, the Commission established a procedure for the certification of Underwater Cavers, a certification that is sometimes required for exploration and diving in countries that rigidly apply the precautionary principle imposed by their administrations.

The highlights of our commission in recent years were as follows:

- Organization of cave diving sessions dedicated to promoting the activities of the UIS and the Karst as a sensitive environment.
- Public presentations within the framework of the International Year of Caves and Karst 2021-2022.
- Creation of a catalogue of satellite image resources for the organization of an exploration campaign in the Chiribiquete massif.

*Sylvain Redoutey exploring Notre Dame des Anges, in Vaucluse, France.*

*Le rôle de la commission de plongée souterraine est celui d'un facilitateur en termes de formation à la plongée souterraine ainsi quà l'exploration spéléologique. En effet il ne s'agit pas d'une commission de pouvoir qui édicte des préceptes et des règles, cela étant du ressort des organisations nationales, mais celui d'une commission de conseil axée principalement sur l'assisstance à la formation en plongée souterraine pour les membres de l'UIS et de facilitateur d'exploration dans des régions non couvertes par l'expertise des commissions nationales. Depuis le dernier congrès de l'UIS en 2017 en Australie, la Commission de Plongée Souterraine a ainsi continué sa mission de service auprès des plongeurs spéléologues dans le monde entier, ainsi qu'auprès des diverses commissions nationales.*

*C'est à ce titre que les contacts furent nombreux avec des plongeurs spéléologues de divers pays à travers la plupart des continents, ainsi qu'avec certaines commissions nationales désireuses de se constituer ou de moderniser leurs structures. Tout au long de ces années des échanges fructueux furent maintenus avec la Commission de Secours en la personne du regretté Christian Dodelin.*

*Rappelons que suite au congrès de Kerville, la commission a mis sur pied un procédé d'habilitation à la plongée souterraine en délivrant un certificat de Subaquatic Speleologist, certificat parfois nécessaire pour pouvoir pratiquer l'exploration et la plongée dans certains pays appliquant de manière rigide le principe de précaution imposé par leur administration.*

*Au-delà de cela les points saillants de l'activité de notre commission durant ces dernières années furent les suivants:*

- *Organisation d'ateliers de plongée souterraine dévolus à promouvoir les activités de l'UIS ainsi que l'importance du Karst comme environnement sensible.*
- *Organisation de présentations grand public dans le cadre de l'Année du Karst 2021.*
- *Réalisation d'un catalogue des ressources d'imagerie satellitaire pour l'organisation d'une campagne d'exploration dans le massif du Chiribiquete en Amazonie, Colombie.*

• Collaboration and support for the publication of a new cave diving practice and technique manual produced by the Italian Cave Diving School, a member of the *Società Speleologica Italiana*.

• Collaboration with the authors of a book on the great springs in Switzerland.

• The monitoring of the legislation related to the responsibility of the owners of the natural sites where speleogical explorations are carried out.

*Exploration of the Source Bleue de Chaudron, Northeast of France.*

• Contact with the interested political and administrative authorities to facilitate the organization of exploration expeditions in Europe.

• Certification of several applicants as Underwater Speleologist.

• Facilitation of specific courses for the practice of cave diving with CCR rebreathers.

• Several translations for the cave diving texts of the UIS Congress 2021-2022.

• Adapt the Commission's website to mobile devices by making it available on smartphones and tablets (https://cdcuis.wordpress.com).

A special mention is deserved for the commission's effort during the rescue of the 12 Thai boys and their coach, from the Tham Luang cave in 2018. The event galvanized minds and media around the world for several weeks. Numerous journalists and individuals requested information, prompting us to maintain an information channel to explain the specific human and technological challenges the rescuers were faced with.

In current times, the predominance of social networks as channels of mass information has become a reality that no organization can escape. The commission will therefore have to adapt its communication to include these channels in order to continue its mission effectively into the future.

After nine years spent as president of the UIS Cave Diving Commission, I have decided to retire from the position to concentrate on cave diving activities that have become somewhat neglected in recent years.

I thank everyone from around the world who have been involved in the running of the commission, as well as the members of the board. The UIS 2022 congress in Chambéry, France, will be the opportunity for the UIS cave divers to elect a new board and president.

*• Collaboration et soutien pour la publication du nouveau manuel de pratique et technique de la plongée spéléologique de l'École Italienne de Plongée Souterraine, membre de* Società Speleologica Italiana (SSI).

*• Collaboration avec les auteurs d'un livre consacré aux grandes sources de la Suisse.*

*• Suivi de la législation concernant la responsabilité des propriétaires de sites naturels dans lesquels se déroulent les explorations spéléologiques.*

*• Contact avec les autorités politiques et administratives concernées pour faciliter l'organisation d'expéditions spéléologiques en Europe.*

*• Facilitation de cours spécifiques pour la pratique de la plongée souterraine en recycleur CCR.*

*• Certification de plusieurs requérants comme Subaquatic Speleologist.*

*• Diverses traductions pour les textes de plongée souterraine du Congrès UIS 2021-2022.*

*• Modernisation du site internet de la commission en le rendant compatible avec la lecture sur smartphone et tablette* (https://cdcuis.wordpress.com).

*Une mention toute particulière concerne l'activité de la commission durant le secours en Thaïlande en 2018 dans la grotte Tham Luang, de 12 garçons et de leur guide (joueurs de football amateurs), un événement qui a occupé les esprits et le médias du monde entier pendant plusieurs semaines. Les demandes d'information des journalistes et des particuliers furent nombreuses, et c'est à ce titre que nous avons entretenu avec eux un canal d'information pour expliquer le caractère particulier des défis humains et technologiques auxquels les sauveteurs devaient faire face.*

*De nos jours, la prédominance des réseaux sociaux comme canaux d'information de masse est une réalité concrète à laquelle nulle organisation ne peut échapper et dans le futur la commission devra adapter sa communication à ces canaux pour continuer efficacement sa mission*

*Après neuf ans passés à la tête de la Commission de Plongée souterraine de l'UIS comme président, j'ai décidé de me retirer de cette fonction, pour me concentrer sur des activités quelque peu délaissées ces dernières années au profit de la plongée spéléologique. Je tiens ici à remercier tout ceux et celles qui se sont impliqués de près ou de loin dans la vie de notre commission ainsi que les membres du bureau.*

*Le congrès de l'UIS 2022 à Chambéry en France sera l'occasion pour le plongeurs spéléos de l'UIS de choisir un nouveau bureau et un nouveau président.*

ACTIVITY OF COMMISSION

# NEW CAVES FOUND BY REMOTE LOCATION OF CAVES (RLC) INTERNATIONAL PROGRAMME WITH THERMAL CAMERA FROM A DRONE

By Yavor Shopov*[1], Krisia Petkova[1], Ognian Ognianov[2]
[1]*Caving Club "Academik" - Ruse, Bulgaria* - [2]*Acceco, Bulgaria*
*Contact: Yavor Shopov (Bulgaria)
*President of UIS Commission on Physical Chemistry and Hydrogeology of Karst*
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The aim of this work is to find new unknown caves with thermal camera from unmanned aerial vehicle (UAV). Development of this innovative technique is one of the main tasks of the International Programme on Remote Location of Caves (RLC) of the Commission on Physical Chemistry and Hydrogeology of Karst (Shopov 2013, Shopov et al., 2021) of the International Union of speleology (UIS) and this work is a part of it. It will be very helpful to find new caves in hardly accessible regions and even on other planets (Shopov, 2017, 2019b, 2021).

Almost all previous studies of the possibilities of remote location of caves with thermal infrared cameras are made on previously known caves and are aimed on demonstration of the potential to locate known caves (Judson et al., 2008, Baroň, et al., 2013), rather than to make thermal infrared survey for location of new caves.

Aerial thermal images (like this on *Fig. 2, top left*) are best source for remote cave location (Baroň et al. 2013; Shopov 2013; Shopov & Ognianov, 2019; Shopov et al., 2019a; Shopov et al., 2021; 2021a; 2021b).

## Terrain mapping from drone in visual band for 3D reconstruction

To develop 3-D surface models of the studied karst terrain we used terrain mapping from drone in the visual band. For maximum precision of digital models, we made a series of images of the nadir with a high degree of overlap in the horizontal (80%) and in vertical (70%) directions, covering the entire area surveyed. Detailed visual ortophotos (like this on *fig. 2, bottom right*) produced from this mapping are valuable information source to check suspicious thermal images against detailed visual image for potential cave entrances. Acquired images serve as inputs to "computer vision" software to generate a point cloud of x, y, z coordinate to further generate Digital Surface Model (DSM), digital orthophoto and 3-D surface models (*fig. 3,4*). We obtained very detailed reconstruction of the terrain, with pixel size of 2- 3 centimetres. With such model we can find even smallest positive and negative landforms (cave entrances).

## Thermal imaging from drones

Recently we made aerial survey for remote detection of unknown caves capturing 3436 images from 7 flights over 4 different polygons (*fig. 1*) near Sveshtari, Bulgaria (Shopov et al., 2021).


**Figure 1:** *Three of our flight polygons near the village of Sveshtari. On the left is polygon 1, Demir Baba Teke, which will be studied here.*

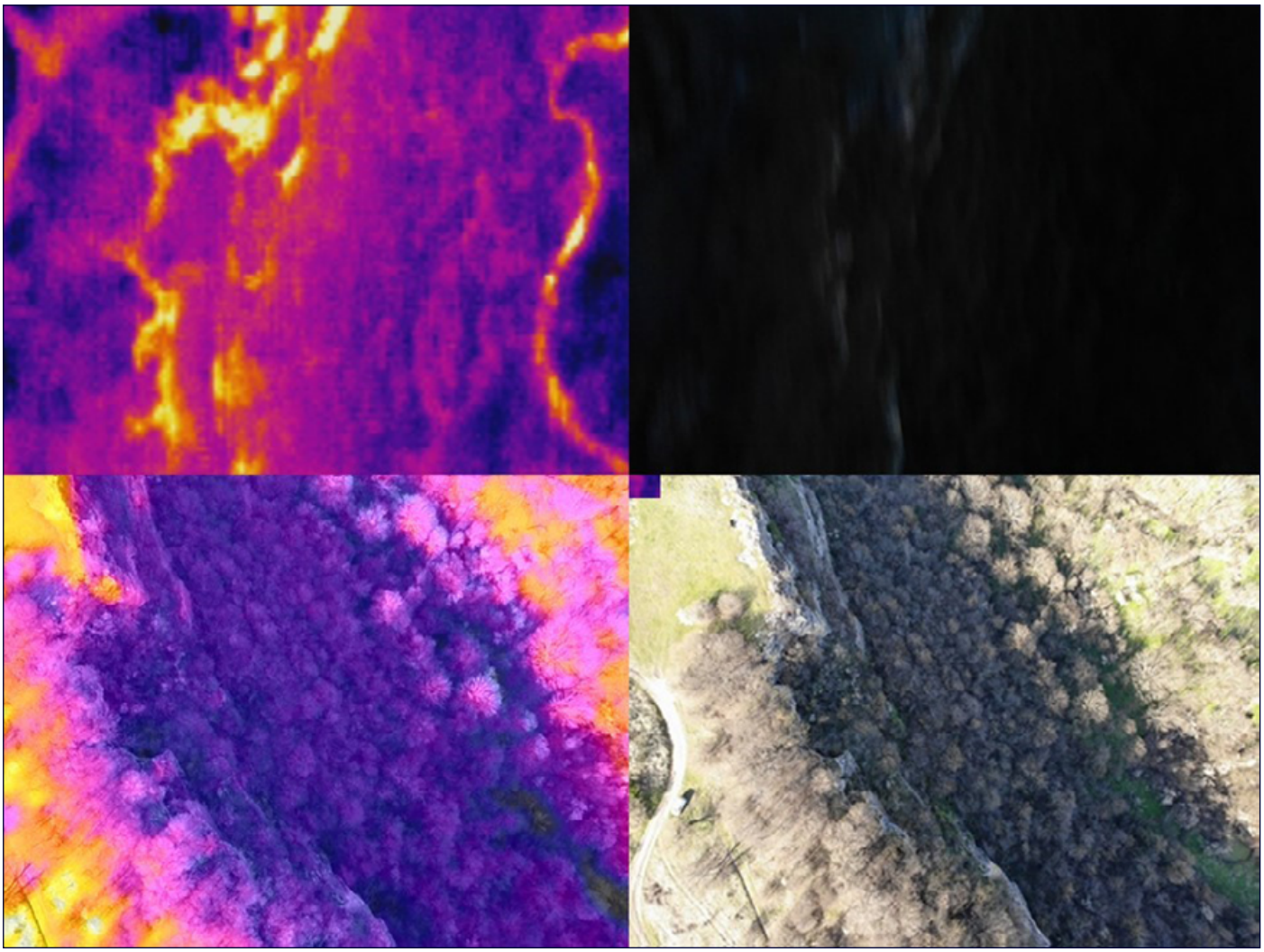

**Figure 2: Cave entrances located with a thermal infrared camera.**
*Cave entrances (in orange and yellow), located with a thermal camera (top left), photographed by the UAS, flying 95 meters above the ground. The hottest areas of the image are highlighted in white, while the less hot ones in descending order of temperature are highlighted in yellow, orange, red, purple, blue, and black, respectively, which are the coldest areas in the frame. The same area was captured simultaneously in the visible region before sunrise (top right) and the same afternoon (bottom right), as well last image integrated with a thermal image of the same area (bottom left).*

Half of the obtained images are in the visible (*fig. 2, right*) and half in the thermal infrared (TIR) area of the spectrum (*fig. 2, top left*) capturing simultaneously the same part of the terrain, which allows superposition of each pair of images (*fig. 2, bottom left*).

Finding of cave entrances from thermal images is done by comparing them with their corresponding visible images. Most thermal cameras of drones, unlike ground thermal cameras, are designed only for searching for objects but not for temperature measurements. Therefore, the drone's thermal camera automatically recalibrates the colour scale of each image to achieve maximum thermal contrast of the image to detect objects with a minimal temperature difference from the environment.

For this reason, the thermal images obtained with them have no colour thermal scale and no linear scale. In them, the hottest areas of the image are marked in white, and in descending order of temperature, respectively, in yellow, orange, red, purple, blue and black, which are the coldest areas in the frame (*fig. 2, top left*). Thermal images obtained with a drone do not contain any information about the temperature scale they depict, as well as any values of temperature and the size of the space which is captured on them.

This information could only be extracted from a 3D terrain model. The same applies for the visible orthophotos.

Only 9 caves are known so far in the studied polygon 1 "Demir baba teke" territory. Our thermal survey located 57 entrances of underground cavities in the same terrain (*fig. 3*).

Our following ground survey of the studied polygon found 8 entrances of new caves (*fig. 4*) and two deep-seated faults. Discovery of these unknown caves was proved by measuring GPS coordinates, photography

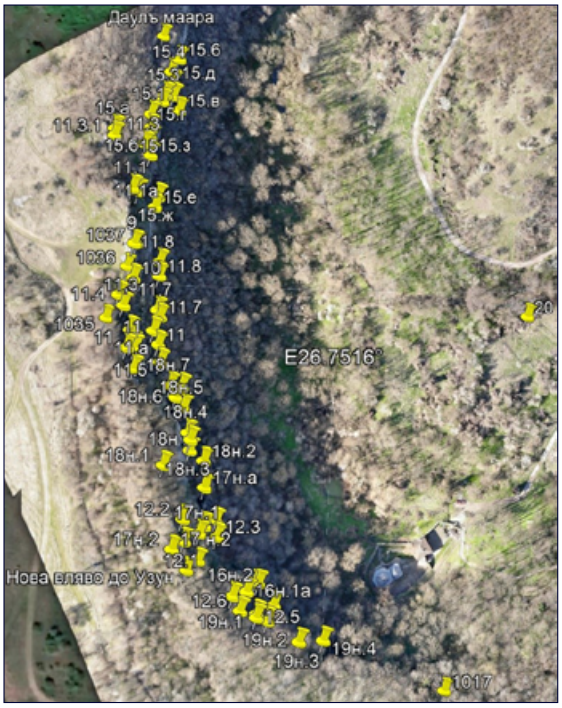


**Figure 3:** *Entrances of 57 underground cavities (marked with two-digital numbers) located by thermal camera from a drone together with 9 known caves (with 4-digital numbers, or named in Cyrillic alphabet) placed on a 3D model of polygon 1, Demir Baba Teke, Sveshtari, obtained from a mosaic of 252 orthophotos. 48 of these remotely located entrances of underground cavities are newly discovered!*

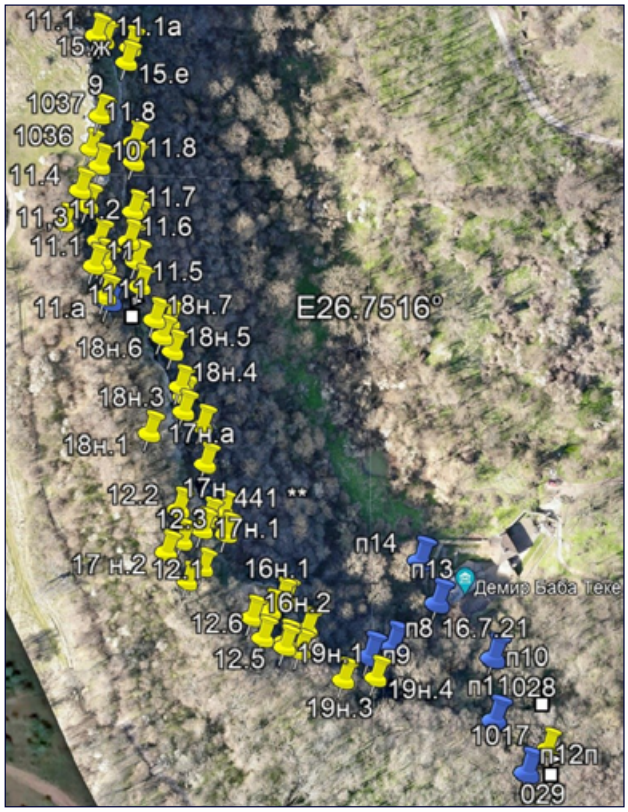


**Figure 4:** *New cave entrances located by thermal survey from a drone pointed with yellow pins and entrances of newly discovered unknown caves, found during a field trip on July 16, 2021, marked with blue pins.*

and thermal imaging of the entrances of all found caves and their comparison with those documented in the Main Bulgarian cave maps library for the same area.

Only those caves whose maps and descriptions are indexed in this library are considered to be known caves in Bulgaria. Three of the discovered new caves are potentially habitable and are interesting for archeologic studies. Previous ground survey of the same terrain during the last 50 years located only 9 another caves.

On July 16, 2021 Yavor Shopov made ground survey of polygon 1, Demir Baba Teke, Sveshtari to search for the 48 new entrances of underground cavities, registered with a thermal camera from a drone on April 10, 2021 (*Fig. 3*). During the ground survey he found 8 new unknown caves in the studied area (*Fig. 4*). They are marked with blue pines in *Fig. 4*.

This is a significant achievement, taking into account that this area has been the subject of a detailed search for caves of 3 national cave expeditions in the 70s and 7 expeditions of the Bulgarian Cave Society in the last 4 years. However, only 9 other caves has been found in the area during the last 50 years (A. Jalov

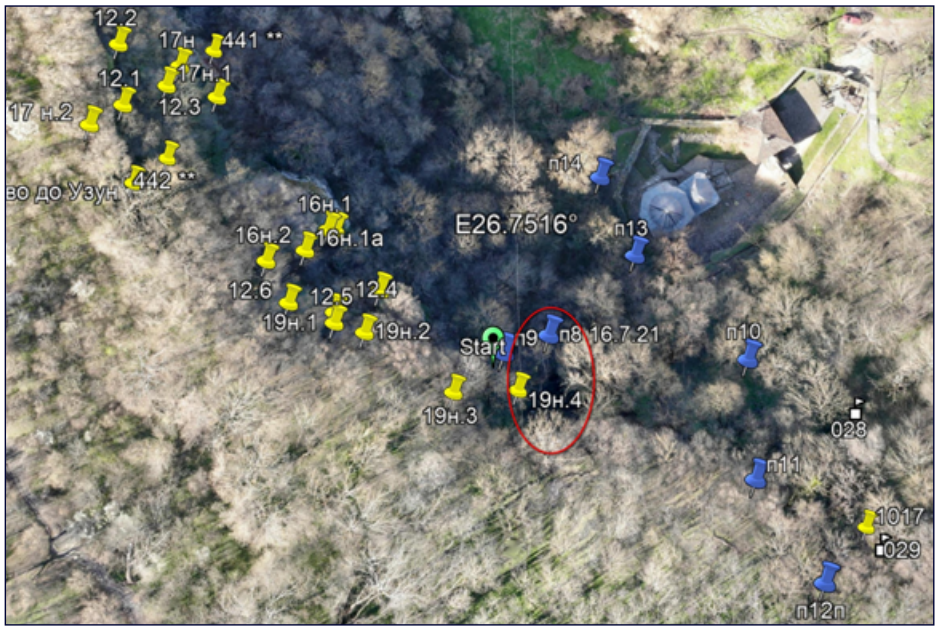


**Figure 5:** *Entrances of newly discovered unknown caves (pointed with blue pins), found during the ground survey after their detection with a thermal camera from a drone.*

**Figure 6:** *The upper entrance (19 н.4) of the newly discovered cave Krisina, located by the thermal camera from the drone on 10th April 2021.*

**Figure 7:** *The lower entrance (п.8) of cave Krisina found during a ground survey on July 16, 2021 after the location of the upper entrance by the thermal camera from the drone.*

(in preparation)). The most interesting is the newly discovered cave Krisina, which has the largest displacement in the entire region of Sveshtari. It has two entrances (surrounded by a red ellipse in *Fig. 5*).

The upper entrance (19 н.4) presented on *fig. 6* is located on the plateau and was found by the thermal camera from the drone while the lower entrance (п.8) presented on *fig. 7* was found by ground survey of the terrain on July 16, 2021 after the location of the upper entrance by the thermal camera from the drone.

Only the upper entrance can be located by the thermal camera, because warm air comes only from there, while the lower entrance inhales air from the surface, which is with the same temperature as the environment, so lower entrance cannot be detected by thermal camera. Entrances of tectonic caves (like п.13 and п.14) also cannot be detected by thermal camera, because air temperature inside them is the same as the temperature of the environment.

Below (*fig. 8 and 9*) we present thermal images obtained by Seek pro ground radiometric thermal camera and photos of some of the new caves we have discovered.

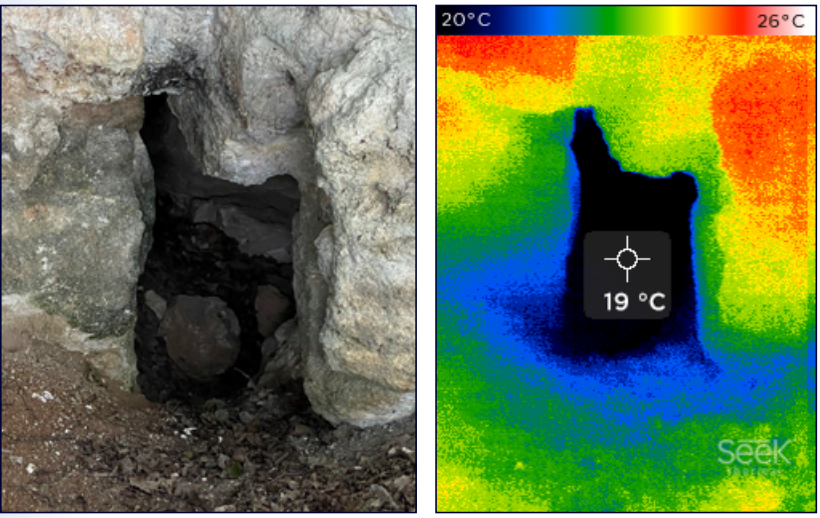


**Figure 8:** *Entrance to the new cave п.6 (left) discovered by us and thermal image of the entrance (right).*
*In the middle is given the temperature value in the respective place of the cave, marked with a cross. The color temperature scale of the thermal image is shown at the top of the thermal image. The ambient air temperature during shooting was 30 °C.*

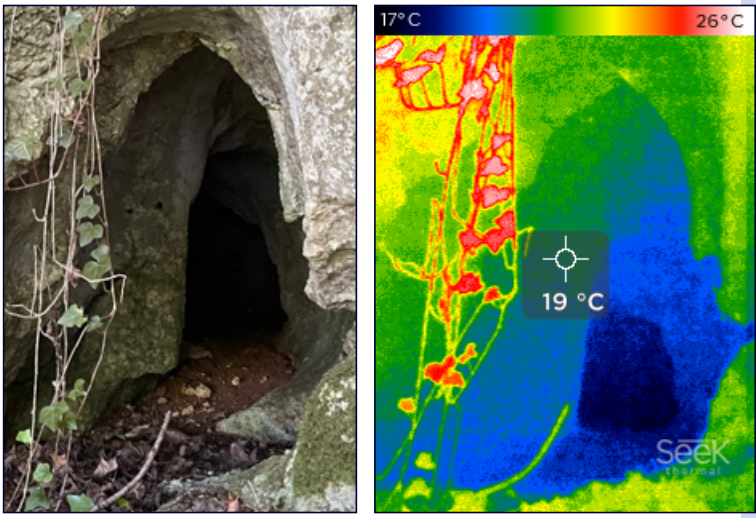


**Figure 9:** *Entrance to the new cave п.10 (left) discovered by us and thermal image of the entrance (right). In the middle is given the temperature value in the respective place of the cave, marked with a cross.*
*The ambient temperature during shooting was 30 °C. The color temperature scale of the thermal image is shown at the top of the photo.*

## Discussion

Obtained results require further extensive ground survey to locate all thermal anomalies on the ground and to check their character: are they cave entrances or are just outlets of the air coming from a giant, closed underground cave chamber, which collapse produced the entire depression of Demir Baba Tekke karst polie? In both cases it is necessary to measure their precise GPS coordinates on the ground to locate them precisely on topographic maps.

## Conclusions

Here we demonstrated that aerial survey for remote location of caves with coaxial pair of thermal and visible cameras mounted on a UAS can detect much greater number of entrances of underground cavities and deep-seated faults than detailed systematic ground survey by experienced personnel. Studied polygon 1 "Demir baba teke" along the Krapinets river valley, has been subject of 3 national caving expeditions and of detailed systematic ground survey by Bulgarian Speleological Society for several years, although this aerial survey detected several times greater number of cave entrances within hours. It demonstrates that using of UAS integrated with coaxial TIR and visible cameras is extremely prospective and reveals great possibilities to raise the level and sophistication of techniques for location of unknown caves to a much higher level.

Obtained results are a significant step forward in the-State-of-the-Art of the location of unknown caves.

The 18th International Congress of Speleology in France will include a Special Session on "Geophysical Methods & Location of Unknown Cave" (including Remote Location of Caves) in the frames of Symposium 9 "Topography, Mapping, 3D, Documentation".

It will be best place to get familiar with the results and potential of International Programme on Remote Location of Caves (RLC) of the UIS Commission on Physical Chemistry and Hydrogeology and to establish collaborations to expand its field work in other countries.

## Acknowledgments

This research was funded by National Science Fund of Bulgarian Ministry of Education and Science with research grant DN14/4 from 2017 to Yavor Shopov. It is a part of the International Programme on Remote Location of Caves (RLC) of the Commission on Physical Chemistry and Hydrogeology of Karst of the International Union of speleology (UIS) led by Y. Shopov.

We gratefully thank to Tihomir Enchev for the help in mapping of the found new caves, to prof. Diana Gergova for providing of details about known archaeological objects, Alexey Jalov and Peter Delchev for providing GPS coordinates of the cave entrances and useful discussions.

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RESEARCH ON CAVE PROTECTION

# CAVE AND KARST LEGAL STATUS WORLDWIDE ASSESSMENT:

## *An initiative of the UIS Karst and Cave Protection Commission*

By
Jean-Pierre Bartholeyns *(Belgium, President of the UIS Karst and Cave Protection Commission)*
Ferdinando Didonna *(Costa Rica)*
Francesco Maurano *(Italy)*
George Veni *(USA, UIS President)*
**Corresponding address:** *cave.protection.laws@gmail.com*

Karst is a type of landscape that covers an estimated 20% of the world's land surface. Karst is created by the dissolution of bedrock. On the surface, it takes many forms, which makes it difficult for the average person to recognize. Some are dramatic and scenic. Much of karst landscapes is hidden from view in caves.

Caves and karst are priceless resources. Hundreds of caves are open to tourism around the world, many in World Heritage sites. About 150 million tourists visit caves each year, providing vital support to many national economies. Karst aquifers provide an estimated 10% of the world's drinking water and include the largest wells and springs on Earth.

A first attempt at a review had been launched by the UIS Department for the Protection of Karst and Caves in 2005. Although the responses obtained were nevertheless an interesting source of information, they were not numerous enough to draw conclusions.

Although it was not commonplace 200 years ago, the idea of caring about the conservation of caves nevertheless existed in the minds of some. Thus, in 1820, in the colony of Cape Town (now South Africa), there was the first attempt in the world to legislate for the conservation of caves in the case of Cango Cave north of Oudtshoorn.

It was during the long trip from Brussels to the EuroSpeleo Forum 2018 in Ebensee (Austria) that this idea resurfaced and largely fueled the discussion between F. Didonna and J-P Bartholeyns. The main ideas of this project were stated, and it remained to write them clearly and launch the machine.

The dynamism of the movement of the International Year of Caves and Karst 2021-2022 (IYCK) initiated by the UIS and supported by UNESCO, seemed to be for the UIS Karst and Caves Protection Commission the right time to relaunching in March 2022 a worldwide census of the legal status of caves and karst.

The idea is to start a basic assessment of national, regional, and local regulations on caves, karst, and caving worldwide to strengthen common knowledge about karst and cave protection. UNESCO and the UIS have initiated discussions on the best way to inform and educate while ensuring the protection of the karst environment around the world, and this initiative created a baseline for cave and karst regulation worldwide.

This initiative has started collecting information through a specific survey online with the following questions:

**1.** Please write the name of your country

**2.** Are caves private or public properties? {In this section, please explain to us who is legally the owner of a cave in your country. Are caves private or public properties? Or is it more complex than that?}

**3.** Where are regulations regarding ownership of caves found in your country's legislation? {Please provide the name of the cave property law/regulation and articles. If possible, send copies of the files to: *cave.protection.laws@gmail.com*.}

FRANCESCO MAURANO

*Cavers around the world are engaged in karst and cave protection: cleaning operation in Italy's karst. Photo by Francesco Maurano.*

**4.** Is karst recognized as a specific environment in your legislation?

**5.** Is karst protected in your legislation?

**6.** Please indicate if there are regulations that are directly related to karst protection. If available, please send it to: cave.protection.laws@gmail.com.}

**7.** Is the practice of caving regulated in the country?

8. Please indicate if there are regulations that are directly related to speleological activities. If available, please send to: cave.protection.laws@gmail.com.}

**9.** ***Value of karst and caves:*** *Caves and karst areas are delicate environments of our natural heritage under threat from several risks and hazards such as: quarrying, water pollution, dumping, insensitive tourism, urban development, vandalism, and bad caving practice. Farming, particularly intensive rural land development, can disrupt natural drainage to features such as dolines and swallow holes.*

Based on the text above, please list national, regional, and local regulations and laws related to caves and karst. Please send any laws and regulations to: cave.protection.laws@gmail.com. {Caves are related to many aspects of human development such as agriculture, water management, industrial and urban development, please list here rules and laws that in your knowledge are related to caves and karst}.

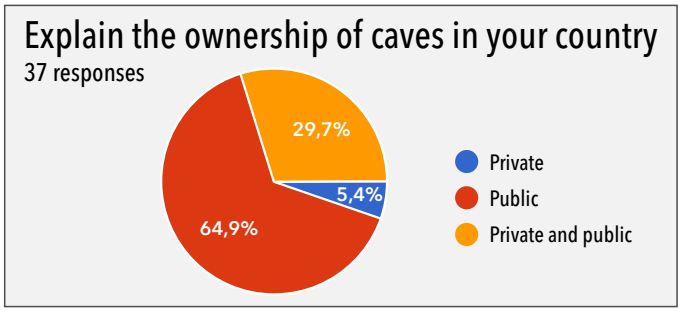
## Results as of 31 May 2022

We received 37 responses from the 29 countries listed below:

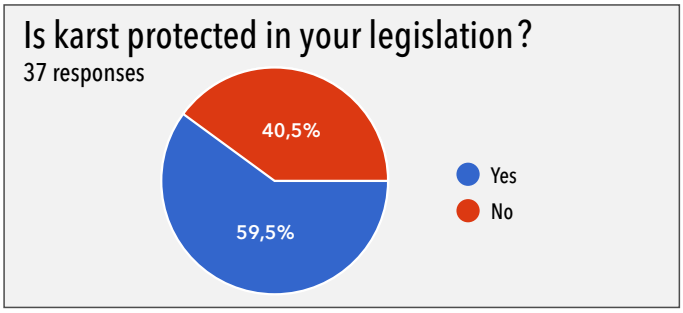
| | |
|---|---|
| 1) Albania | 20) Mongolia |
| 2) Argentina | 21) Nepal |
| 3) Bosnia and Herzegovina | 22) New Zealand |
| 4) Brazil | 23) Philippines |
| 5) Brazil | 24) Philippines |
| 6) Bulgaria | 25) Puerto Rico |
| 7) Canada, Québec | 26) Republic of Korea |
| 8) Costa Rica | 27) Romania |
| 9) Cyprus | 28) Romania |
| 10) Czech Republic | 29) Romania |
| 11) Germany | 30) Serbia |
| 12) Greece | 31) Switzerland |
| 13) Hungary | 32) United Kingdom, England |
| 14) Indonesia | 33) United Kingdom, Scotland |
| 15) Iran | 34) USA |
| 16) Israel | 35) USA |
| 17) Italy | 36) Vietnam |
| 18) Lithuania | 37) Vietnam |
| 19) Lithuania | |

The following data are the raw results without any verification and correction at this time. Some of the countries are repeated and some include conflicting results. The numbers below should be considered informative and not the final conclusion by the authors.

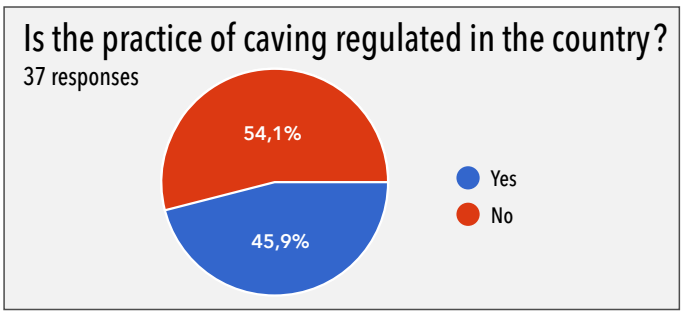
The ownership of the caves was chosen as the first question to assess the legal responsibility of caves and karst. The data give us a mixed situation:




Another interesting question is about karst protection. Based on the responses, karst is protected in more than 50% of countries responding, as follows:




A further important aspect that we are trying to understand is if speleology is regulated. Most countries do not regulate it (below):




This project will be the subject of a discussion open to all during the meeting of the UIS Karst and Cave Protection Commission during the 18th International Congress of Speleology in Chambery, France, in July 2022.

FRANCESCO MAURANO

*Cave and karst underground waters are fragile. In this photo they are under direct threat of plastic pollution and are being cleaned as part of the Bussento Project Plastic Contamination in an underground lake in Italy.*

## Specific key questions and response received:

| Please write the name of your country | Explain the ownership of caves in your country | Is karst protected in your legislation? | Is the practice of caving regulated in the country? |
|---|---|---|---|
| 1) Albania | Private and public | No | yes |
| 2) Argentina | Private and public | No | No |
| 3) Bosnia and Herzegovina | Public | No | No |
| 4) Brazil | Public | Yes | No |
| 5) Brazil | Public | No | No |
| 6) Bulgaria | Public | Yes | yes |
| 7) Canada, Québec | Private and public | No | yes |
| 8) Costa Rica | Private and public | No | No |
| 9) Cyprus | Private | No | No |
| 10) Czechia | Public | Yes | yes |
| 11) Germany | Private and public | Yes | No |
| 12) Greece | Public | Yes | No |
| 13) Hungary | Public | Yes | yes |
| 14) Indonesia | Public | Yes | No |
| 15) Iran | Public | No | No |
| 16) Israel | Public | No | yes |
| 17) Italy | Private and public | No | yes |
| 18) Lithuania | Public | Yes | No |
| 19) Lithuania | Public | Yes | No |
| 20) Mongolia | Public | Yes | yes |
| 21) Nepal | Public | No | No |
| 22) New Zealand | Private and public | Yes | No |
| 23) Philippines | Public | Yes | yes |
| 24) Philippines | Public | Yes | yes |
| 25) Puerto Rico | Private and public | Yes | No |
| 26) Republic of Korea | Public | Yes | yes |
| 27) Romania | Public | No | yes |
| 28) Romania | Public | Yes | yes |
| 29) Romania | Public | Yes | yes |
| 30) Serbia | Public | Yes | yes |
| 31) Switzerland | Public | No | No |
| 32) United Kingdom, England | Private | Yes | yes |
| 33) United Kingdom, Scotland | Private and public | Yes | yes |
| 34) USA | Private and public | Yes | No |
| 35) USA | Private and public | No | No |
| 36) Vietnam | Public | Yes | No |
| 37) Vietnam | Public | No | No |

The information analysis and systematization will require a major effort and at least the collection of information from all 57 UIS member countries.

If anyone with a specific thematic skill or interest is interested in collaborating directly with this research and data analysis, please contact us at UIS IYCK LEGAL STATUS cave.protection.laws@gmail.com.

The questionnaire to participate in the survey online is https://forms.gle/NZBKykNf2LDhFm2A7.

Union Internationale de Spéléologie

# France HABE Prize 2021

# Prix France HABE 2021

By
Jean-Pierre Bartholeyns (Belgium)
*President of the UIS Commission on Karst and Cave Protection*
jp.bartholeyns@gmail.com

## Introduction

The France HABE Prize is awarded by the Commission on Karst and Cave Protection of the International Union of Speleology (UIS).

The prize is named in memory and honour of Dr. France HABE (☆11/01/1909 - ✞12/10/1999) of Slovenia (Yugoslavia), who among his many other accomplishments served as President of the UIS Protection Department (1973-1997).

The Prize is awarded if a worthy candidate is nominated and accepted. Its purpose is to promote the protection of karst and caves for generations to come. Their natural legacy are proven sources of increasingly rich information about the history of our planet and humanity, enabling people to act more thoughtfully, efficiently, and sustainably for the future of our environment.

The Jury of the France Habe Prize is composed by two members of the Scientific Committee of the UIS Karst and Cave Protection Commission and its President. They assessed each submission following an evaluation about the presentation, compilation, photography, scientific content, and originality.

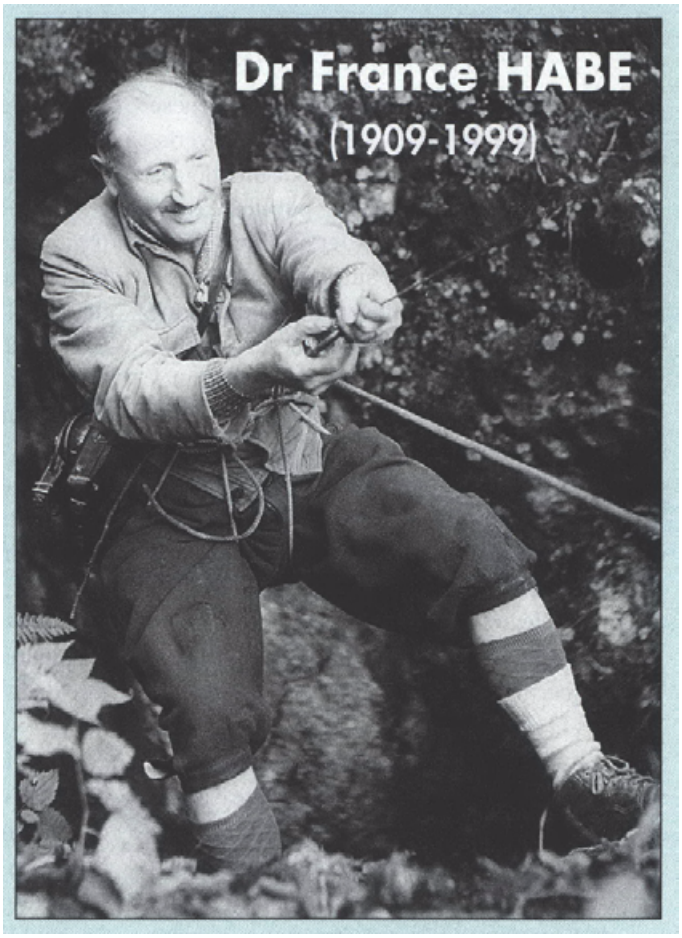
The prize is an annual amount of €250 to the best and most original contribution.

## Winner of the 2021 Prize

The winner of 2021 is the **"Our friends bats"** project. It is a project undertaken by the Speleological Group of Villacarrillo (GEV), from Spain, to make young people aware of the environment and in particular that of caves and thus enable them to understand the importance of bats in the world. Details of the project are on next page of this Bulletin. The Jury congratulates the three other entrants for their actions and activities in Belize, France, and Germany. But also for their investment in karst and cave protection for so many years.

The prize will be awarded again in 2022. The Jury will review the nominations and send their decision to the UIS Bureau. The winner of the Prix France Habe 2022 will be announced during the UIS Awards ceremony which will be organized during the 18th International Congress of Speleology in Chambery, France, from July 24 to 31, 2022.

All information and prize regulations can be found here: http://uis-speleo.org/index.php/karst-and-cave-protection-commission/.




**Dr. France Habe** (Karstologie n°35 - Archives of the Karst Research Institute Postojna (part of Scientific Research Center). *Gauging by the appearance of his face it looks taken in the early 1970s.)*

FRANCE HABE PRIZE WINNER 2021

# OUR FRIENDS BATS

## Conservation and Protection Through Environmental Education

By Toni Pérez Fernández & José Ángel Cabot García (Spain)
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bioespeleologiaGEV@gmail.com

## Introduction

During the previous year 2021 as the International Year of the Caves and Karst, the Speleological Group of Villacarrillo has developed a short and medium-term project in order to make young people aware that bats are not dangerous animals for the health, especially due to the bad press around them during the pandemic of COVID-19, nor horrifying animals, as the mass media has always done. As a result, it has been created the project called 'Our friends bats', which has recently been awarded the France HABE Prize 2021 by the Karst and Cave Protection Commission of the International Union of Speleology (UIS).

The original and main purpose of the project is to encourage children to investigate, protect and preserve the bats and their shelters the caves. Under this premise, the club organised the 1st Drawing Contest for Children in 2021 holding the participation of more than 750 children from all over the Spanish territory and other different countries and only 6 out of all the drawings were chosen as winners (Olivia Cid Álvarez, Hernán Fuentes López, Adi Dallo Aguerralde, Celia Vela Moreno, Marina Ribes Pino and María Jesús Fuentes Osorio) (*Images 1 and 2*). All the drawings were published on the website, including the winners and they can be seen in: https://murcielagosamigos.blogspot.com/2021/03/exposicion-virtual-los-murcielagos.html). The jury was formed by 5 members of the group's governing board and 5 children from 8 and 14 years old of the youth academy of the group (see in ttps://murcielagosamigos.blogspot.com/2021/03/jurado-del-concurso-los-murcielagos.html ).

This initiative has been possible thanks to the help of national and international associations for the conservation and research of bats, publishing houses which have provided articles and tales about bats *(Plutón Ediciones, Editorial 'La Galera', Editorial Kalandraka y Editorial Juventud)*, schools and their parents' associations, youth information centres, speleology groups and associations for the conservation of the environment. In addition, all the participants and collaborators received a certificate for their contribution and effort, as it is shown in the images uploaded in the web. In these campaigns, it is possible to see different videos visiting the link https://murcielagosamigos.blogspot.com/2021/03/lamias-el-murcielago.html), tales and other activities developed with children at schools related to the investigation about the bats. (To see all these activities, access https://murcielagosamigos.blogspot.com/2021/12/actividades-con-nins-en-el-cole-ceip.html).

Moreover, the activities have been reported in different media, including, newspapers, radio programmes and websites, turning out to be a total success (see in https://murcielagosamigos.blogspot.com/2021/04/los-medios-de-comunicacion-jiennenses-y.html) .

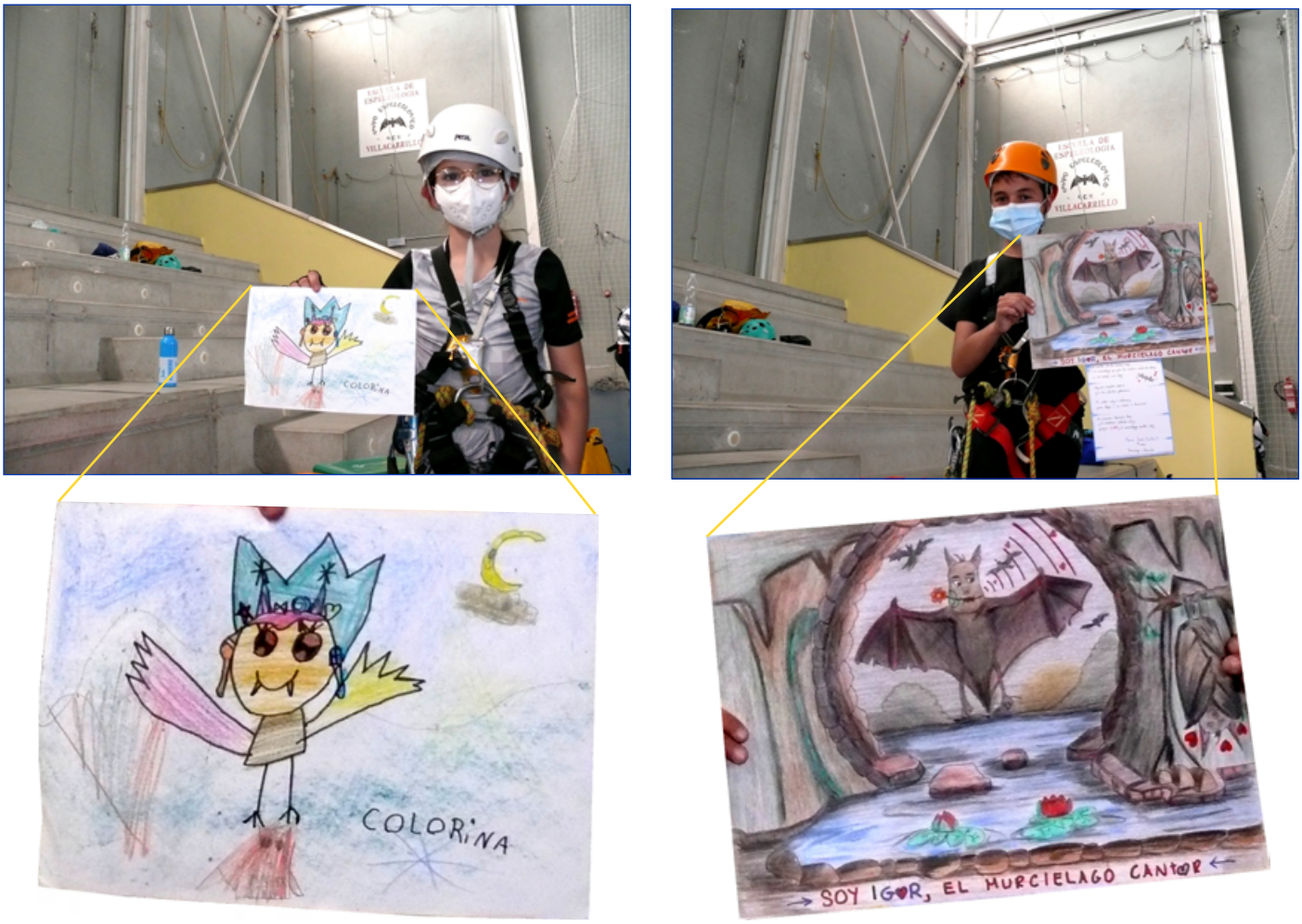
Afterwards, a blog has exclusively been created to inform children about news, events, activities and every type of information related to the world of bats. It is continuously being updated with new entries about important facts, news and curiosities. It is possible to visit the blog accessing https://murcielagosamigos.blogspot.com/

Furthermore, the club developed a more technical and illustrative activity carrying out a digital conference with the president of the Spanish Association for the Conservation and Research of Bats (SECEMU) organized in association with the Youth Information Centre of Villacarrillo as well as the youth centres of the South of Spain to educate people about the importance of protecting bats. The conference was highly successful due to the many attendees.

With the collaboration and help of ANSE Association and Editorial 'La Galera', the Short Story Contest for Children has also been organized during the previous year to encourage reading and writing skills and children's imagination. Every type of short story related to bats is allowed, such as, fables, tales and even research articles. The purpose of this initiative is to encourage children to continue investigating bats to preserve and protecting them and their shelters the caves. The results of the contest were outstanding due to a large number of participants from all over the Spanish territory: 114 short stories relating tales, descriptions or legends about bats. Out of all them, the short stories written by María Aixalà Marco, Daniel Blanco and María Jesús Fuentes Osorio were chosen as the winners (see in https://murcielagosamigos.blogspot.com/2021/09/ya-tenemos-los-ganadores-del-concurso.html).

Several schools and high schools have also been part of our project 'Our friends bats' sending drawings, handicrafts, and research activities about them, that have been shown to other schools as examples for how to develop activities which highlight the life of the bats.

The current year 2022 has been proposed by the Union International of Speleology (UIS) as the International Cave Animal and the name of the Speleological Group of Villacarrillo has decided to collaborate developing several events. Firstly, we created the International Awards CHIROPTERA to recognise all the people, organisations and associations their effort and contribution in investigating, publishing, preserving and protecting bats and their environment. The date of this event has not been published yet as the nomination of candidates is still occurring.




**Images 1 and 2:** *Children of the Youth Academy Speleological Group of Villacarrillo showing the drawings of the 1st International Drawing Contest for Children.*

As a result of the success in 2021 and with the collaboration of Editorial Juventud and Ediciones Tundra, the 2nd Drawing Contest for Children was organized and it ended in March 2022. Six winners (*Image 3*) have been nominated. Their works were the subject of a virtual exhibition and in-person in the village of Villacarrillo as the main host.

In addition to this event, the Speleological Group of Villacarrillo, in association with several schools, Guadalinfo Villacarrillo and the Youth Information Centre of Villacarrillo will organise conferences with workshops and meetings to show people the life of the bats as well as the 'Bat Nights' and environmental education conferences to commemorate the World Environment Day with several experts about these subjects (*Image 4*).

The basis of the current project in 2022 is to provide children information about bats so as to encourage them to investigate, protect and preserve bats, particularly, those that live in caves.

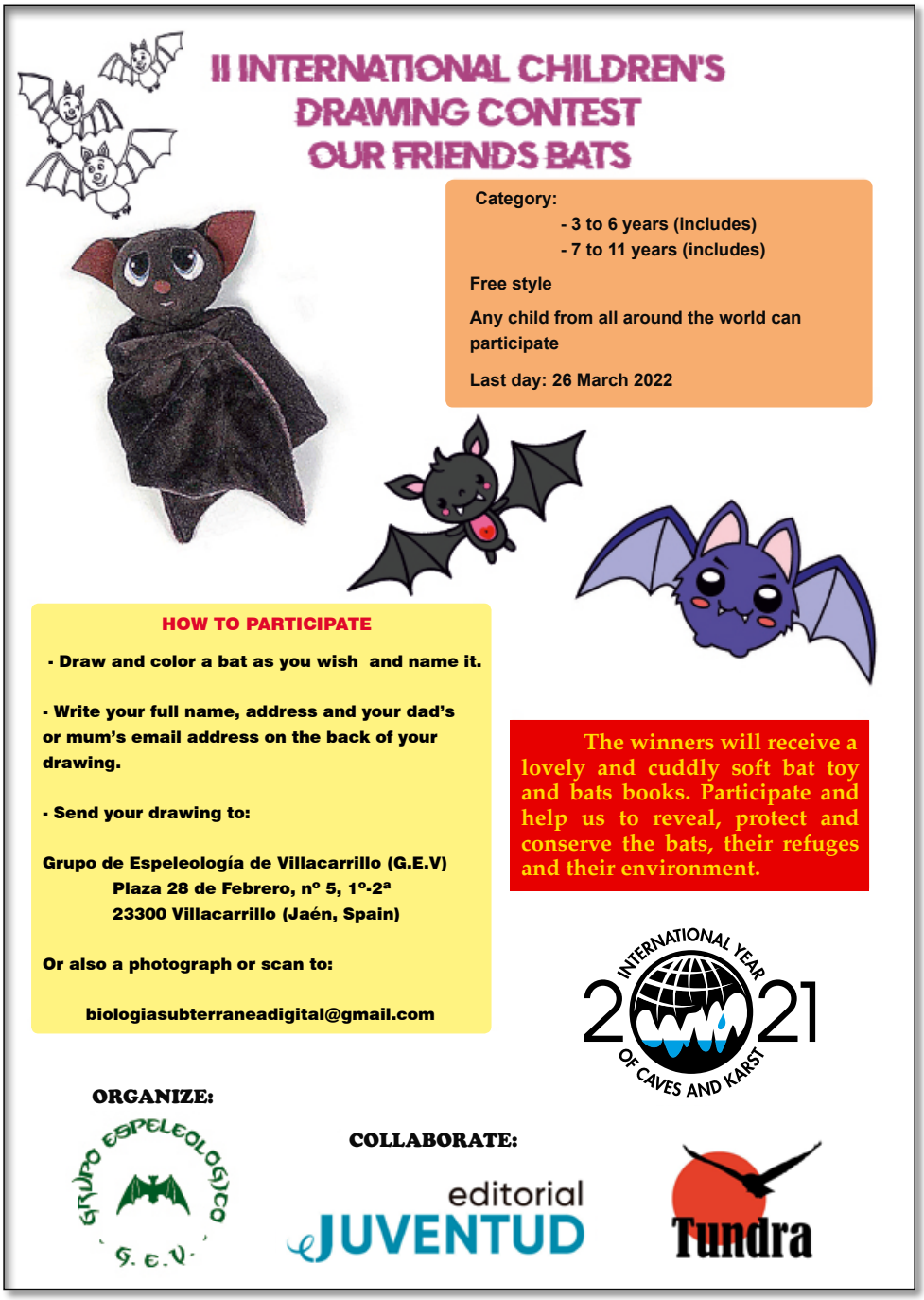



**Image 3:** *Poster of the 2nd International Drawing Contest for Children* ***"Our Friends the Bats."***

**Image 4:** *Explaining the children the importance of bats in the food chain and in the ecosystem of the subterranean biology.*

CAVE PROTECTION

# EUROPEAN NATURE PROTECTION AWARD

## *CaveLife App, from the German Speleological Federation (VdHK), won in the category "Transboundary Cooperation"*

By Bärbel Vogel (Germany)
*President German Speleological Federation (VdHK)*
*Secretary European Cave Protection Commission (ECPC)*
*Adjunct Secretary UIS*
*b.w.vogel@gmx.de*

The Natura 2000 Awards of the European Union Commission were recently presented in Brussels, Belgium. The German Speleological Federation (VdHK) won in the category ***"Transboundary Cooperation"*** with its **CaveLife App**.

The Natura 2000 is the largest transboundary network of protected areas in the world. Since 2014, winners from six different categories have been chosen for their special commitment to nature conservation in Europe. For the 6th edition (2021) of the Natura 2000 Award, winners were announced on 18 May 2022 at the Award Ceremony by Virginijus Sinkevičius, Commissioner for Environment, Oceans and Fisheries and members of the high-level jury, including the Director-General of DG Environment and high-level representatives of the European Parliament, the Committee of the Regions, and relevant stakeholders.

In his laudatory speech, Roby Biwer, representing the Committee of the Regions, noted that no cave habitat project had been awarded before.

The CaveLife App is much more than a smartphone tool. Already in 2015, the VdHK developed a uniform assessment procedure for the monitoring of caves and the holistic recording of its habitat to participate in Natura 2000 assessments. To provide a simple tool for cavers, as well as to identify and document the condition of underground habitats, the CaveLife App was developed based on this assessment procedure. It consists of three pillars: object description, taxa, and threats. The results of the on-site surveys are supplemented with data on geography, protected areas, geology, and hydrology, which the user can then download and save.

The bio-speleological database was revised and expanded. Data collected via the CaveLife App can be easily transferred after a plausibility check. A first precursor of the app was presented by VdHK in 2017 at the 17th International Congress of Speleology (Sydney, Australia), to great interest. In August 2019, the CaveLife App was launched at the VdHK annual meeting. In 2021 it was presented in a workshop during the European Cave Protection Symposium. Currently, the app is used by hundreds of cavers from Germany, Austria, Luxembourg, and Switzerland, and is available in English and French.

The CaveLife App can be downloaded to computers, tablets, or smartphones and can be used offline for data recording in caves.

To promote cave protection, VdHK launched a *#cavers4natura2000* campaign in social media. The outcome was listed at www.vdhk.de/en/. The open letter, on the next page, was presented by the European Cave Protection Commission (ECPC) and VdHK to the European Commissioner after the award ceremony together with the first printed exemplar of the new UIS/IUCN guidelines for cave and karst protection.

Natura 2000 focuses on fauna, flora, and habitats, but geoheritage protection is missing and is needed urgently.


ALEXANDER WEIGAND

**18 May 2022:** *Stefan Zaenker (*left*), Head of the VdHK Biospeleology Department, and Christian Zaenker, VdHK, Developer and Coordinator of the CaveLife App with the Natura 2000 Award in the category Cross-Border Cooperation.*

After the written declaration to protect caves as cultural, natural, and environmental heritage at the European Parliament in 2008, and the petition to stop the trade of cave contents for the European Commission, both failed. Now in the third attempt to the EU, ECPC and VdHK still have hope for a sustainable outcome.

The International Union for the Conservation of Nature (IUCN) adopted a landmark resolution (WCC res. 074) on geoheritage and protected areas at the World Conservation Congress in 2020. Maybe this can be seen as the first sign of a change.

For more information about the Natura 2000 Award, access:

- https://www.vdhk.de/en/
- https://www.vdhk.de/fileadmin/pdf/natura2000/OpenLetter/open_Letter_for_geoheritage_protection.pdf
- http://uis-speleo.org/wp-content/uploads/2022/04/UIS-Guidelines-for-Cave-and-Karst-Protection-2nd-ed-electronic-v6.pdf
- https://portals.iucn.org/library/sites/library/files/resrecfiles/WCC_2020_RES_074_EN.pdf

JEAN-CLAUDE THIES

**18 May 2022, at the Natura 2000 Award Ceremony: Left to right:** *Roby Biwer (Member of the European Committee of the Regions), Virginijus Sinkevičius (EU Commissioner for Environment, Oceans and Fisheries), and Stefan Zaenker, VdHK, Developer and Coordinator of the CaveLife App.*

# OPEN LETTER TO THE EUROPEAN UNION FOR GEOHERITAGE PROTECTION


**Verband der deutschen Höhlen und Karstforscher e. V. VdHK , Hauptstr. 5, D-87484 Nesselwang , Tel. 08361-269,** vorsitz@vdhk.de
**Fédération Spéléologique Européenne - European Cave Protection Commission, B.P. 3067, L-1030 Luxembourg** protection@euroepeloeo.eu

## Open Letter
## Natura 2000 is not enough to protect caves, karst and geoheritage

*Dear Commissioner Sinkevičius,*

Caves and karst areas are important and vulnerable ecosystems and unique geological sites. Both need protection. Natura 2000 focusses on fauna, flora and habitats including “caves not open to the public”. This is a great achievement for cave protection in Europe which should not be underestimated.

Caves harbour a multitude of species, some even endemic, which require the generally constant environmental conditions caves provide. Even small impacts can have detrimental and irreversible effects on the biodiversity of subterranean habitat.

In karst areas, caves offer natural access to groundwater systems, which is of great importance for the water supply of our civilization. Karst aquifers are the most vulnerable to contamination and transport pollutants like pesticides or microplastics large distances through complex flowpaths with effectively no filtration. Thresholds for groundwater protection need to be much higher than in other areas. The EU Groundwater Directive does not take this important issue into account.

The protection of caves as geological heritage and their contents include speleothems, sediments, fossils, etc., but is not regulated by any EU directive. It is not possible to restore caves or compensate them.

They preserve important scientific data, for example on climate change from the past to present or on the evolution of mankind. For geological objects, a treaty similar to CITES is required to prohibit trade.

Caves are the link between biodiversity and geodiversity. Both are equally important. Geological protection has to be raised to the same level as for habitats and species. At the World Conservation Congress 2020, the International Union for the Conservation of Nature (IUCN) acknowledged this with its Resolution 074.

Using the example of the gypsum karst in the German Harz, these different aspects can be briefly explained. The green gypsum karst landscape in the southern Harz is unique in the world due to its forestation. Important parts of the area in three federal states are protected by Natura 2000.

Nevertheless, there are currently major problems and threats:

There are no buffer zones to protected areas. Some gypsum quarries are immediately adjacent to Natura 2000 areas, which thus dry out and are damaged. In Lower Saxony, the state government plans to allow gypsum quarrying outside priority areas for regional planning in the future. In Saxony-Anhalt, there are no quarries so far as it is a biosphere reserve. Nevertheless, the gypsum industry wants to carry out exploratory drilling here, even within Natura 2000 areas.

Although gypsum is a perfect material for recycling, it is still cheaper to establish quarries and destroy landscape which leads to irreversible biodiversity loss and groundwater changes. The same is happening in gypsum areas everywhere.

Every cave is unique with its unique beauty, unique environment, unique scientific contents.

**Once destroyed, no cave can be rebuilt.**

We call on you, dear Commissioner, to take action to include geodiversity - include the “hole” world in EU protection policy.

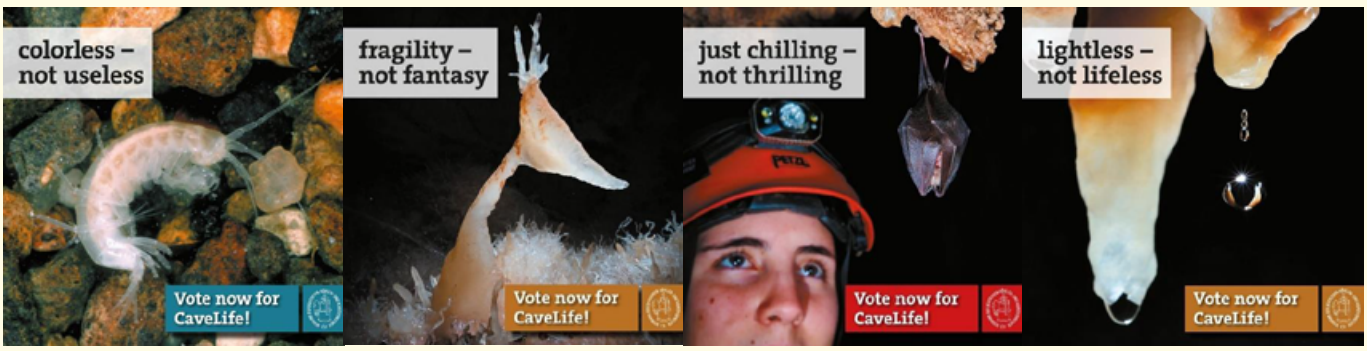
We would be happy to work with you and your commission to provide comprehensive protection that is so desperately needed.

Nesselwang, Germany, 18th of May 2022

**Bärbel Vogel**
*President, German Speleological Federation (VdHK)*
*Secretary, European Cave Protection Commission (ECPC)*
*Adjunct Secretary, International Union of Speleology (UIS)*
*Secretary, IUCN/WCPA Caves and Karst Working Group*

**Jean Claude Thies**
*President, European Cave Protection Commission (ECPC) of the European Speleological Federation FSE*

Links to resolutions and important scientific research are available at https://www.vdhk.de/en/cavelife-app



DOUBLY HONOR

# MAJOR AWARD FOR Dr. MLADEN GARAŠIĆ

By Dr. George Veni (USA)
*UIS President*
gveni@nckri.org

UIS Adjunct Secretary **Dr. Mladen Garašić** (Croatia) was made on Honorary Member of the US National Speleological Society (NSS) during the banquet of the annual NSS Convention on 17 June 2022, in Rapid City, South Dakota, USA. This is the highest award of the NSS, which is the world's largest speleological organization. It is given once each year for sustained excellent service to speleology. The award includes a framed certificate signed by the NSS Board of Governors and lifetime membership in the NSS. Dr. Garašić is the 12th current or former member of the UIS Bureau to receive this honor, and he joins a group of internationally distinguished speleologists. The full list of NSS Honorary Members is available on the NSS website.

Dr. Garašic received his doctoral degree in geosciences and geological engineering in 1986. He has worked as a professor of geology, karst hydrogeology, applied geology, engineering geology and speleology at the University of Zagreb, and has authored more than 350 scientific and professional papers. He has served as a committee member for the Croatian Academy of Science and Arts, UNESCO World Heritage Team for the Dinaric Karst, International Association of Hydrogeologists, and the International Association for Engineering Geology and the Environment.

He started caving in 1963, is the founder of several caving clubs in Croatia, and served as the first president of the Croatian Speleological Federation from 1990 to 2010. Since 1993 he has served as Croatia's delegate to the International Union of Speleology and as the delegate to the European Speleological Federation (FSE) beginning in 2009. From 2013 to the present, Dr. Garašic has been a valuable and respected member of the UIS Bureau, and he is the current FSE Vice President.

Dr. Garašic has conducted research in and explored and visited over 5,000 caves in 86 countries. He has led many speleological expeditions in the longest and deepest caves in Croatia, Europe, and the world.

DALIBOR URUKALOVIĆ/IGOR KRALJ/PIXSELL

*Mladen Garašić in June 2018*


**17 June 2022, in Rapid City, South Dakota, USA:**
*On screen, Mladen being announced as Honorary Member of the US National Speleological Society, the world's largest speleological organization.*

Among his many awards, during the June 2022 Eurokarst conference, in Malaga, Spain, he received an award from the International Association of Hydrogeologist's Karst Commission for his book, ***The Dinaric Karst System of Croatia - Speleology and Cave Exploration***.

Upon receiving his award from the NSS, Dr. Garašic said:

*"After nearly sixty years of caving in 86 countries, this is not my "end," but some kind of acclaim that I was all the time working on speleology in a good and right way. Thanks to all who in some way have supported me in many, and not always easy, years of my speleological activity. The name "The Frontiers of Exploration" for this NSS Convention it is very symbolic and significant to me. This award is in some way a recognition of Croatian speleology and to all cavers who have ever anywhere been with me in the caves. I am the first man from Croatia who gets this respectable award. For me this prize has strong symbolic meaning. This is like a special "Nobel Prize" or "Oscar" for my life's activities. I feel wonderful. This prize shines for all of you. Thanks."*

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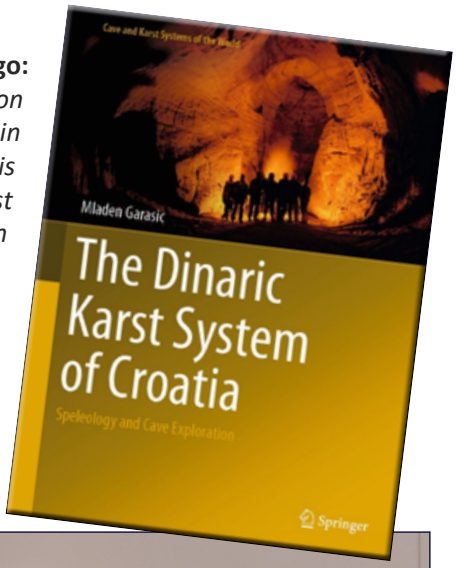
**October 2006:** *Mladen in action.*

BORIS KRSTINIĆ

**View of Velebit Mountain:** *the longest mountain in the Dinaric Karst studied by Mladen in Croatia.*

**International Association of Hydrogeologists**
the World-wide Groundwater Organisation

**IAH Logo:** *The Association awarded Mladen in June 2022 for his book about karst and exploration in Croatia* (right).




DAVOR GARAŠIĆ

**27 June 2022:** *Dr. Mladen Garašić at presentation of his new book at Croatian Academy of Arts and Science in Zagreb, Croatia.*

MARK BURKEY

**Shyphon Veliko Vrelo or Ličanka River Spring near Fužine, Northwest of Croatia:** *Also as a diver, Mladen explored many underwater caves in his country, and abroad.*

UNITED NATIONS EVENTS

# SPELEOLOGY PRESENT AT UN CONFERENCES IN GENEVA, NAIROBI, AND STOCKHOLM

*Representatives from speleology attended the events to promote cave and karst protection.*

By Bärbel Vogel (Germany)
*President German Speleological Federation (VdHK)*
*Secretary European Cave Protection Commission (ECPC)*
*Adjunct Secretary UIS*
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Johannes Lundberg (Sweden)
Ferdinando Didonna (Costa Rica)
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Joerg Dreybrodt (Germany)
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The European Environmental Bureau (EEB), the umbrella organization for nature protection NGOs in Europe, was the door opener to the UN system for speleology. EEB provides information and helps its members like the European, German and Italian Speleological Federations (FSE, VdHK, and SSI).

Starting in 2018 in the NGO Major Group with inputs on groundwater, this year it was possible to actively participate in two major events in Nairobi and Stockholm, and one regional event in Geneva.

The United Nations Economic Commission for Europe (UNECE) Regional Forum for Sustainable Development in Geneva is an event that is very open for the engagement of civil society. It is the European and Eurasian regional meeting that provides input to the global High Level Political Forum in summer in New York.

Joerg Dreybrodt participated in person and promoted karst and cave protection. In a personal conversation, a UN representative pointed out that financing of the Sustainable Development Goals (SDG) is a topic of increased importance. He said companies are experiencing increased cost from climate change and destructive extraction of resources.

They slowly understand the importance of getting more involved and follow up with actions and engage in ecosystem restoration instead of fine words. This can be a door opener in regions with karst for speleology by partnering with a company or one of the related foundations that supports karst protection.

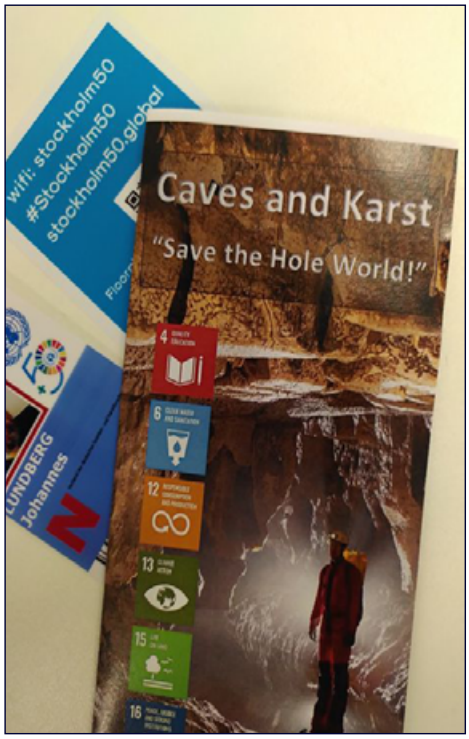
The United Nations Environment Assembly (UNEA) is hosted by the United Nation Environment Programme UNEP, bringing together representatives of the 193 Member States of the UN, businesses, civil society and other stakeholders to agree on policies to address the world's most pressing environmental challenges. Due to the pandemic, UNEA 5 was divided into two sessions, the second one took place in Nairobi in late February. Ferdinando Didonna had the chance to participate on behalf of speleology.

The overall theme was "**Strengthening Actions for Nature to Achieve the Sustainable Development Goals**," highlighting the pivotal role nature plays in our lives and in social, economic and environmental sustainable development.

The UNEA made history this year, through decisions to undertake negotiations on two critical processes: an internationally legally binding instrument by 2024 to end plastic pollution and an agreement to establish a science-policy panel on chemicals and waste, and to prevent pollution.


**Jörg Dreybrodt** *at United Nations Economic Commision for Europe Regional Forum for Sustainable Development in Geneva, Switzerland*


*Ferdinando Didonna (right) at United Nations Environment Assembly (UNEA 5) in Nairobi, Kenya.*




*Johannes Lundberg participated at Stockholm+50.*

In particular three resolutions are in a broad sense related to the protection of caves and karst:

*- A resolution on minerals and metals calls for the development of proposals to enhance their environmental sustainability along their full lifecycle.*

*- A resolution on sustainable lake management calls on Member States to protect, conserve, and restore, as well as sustainably use lakes, while integrating lakes into national and regional development plans.*

*- A resolution on sustainable and resilient infrastructure encourages Member States to integrate environmental considerations in all their infrastructure plans.*

What we learn is that the resolution process for consensus approbation is long and complicated by different countries' interests and negotiations that start at least one year before the UNEA.

In June "**Stockholm+50: a healthy planet for the prosperity of all – our responsibility, our opportunity**" took place five decades after the 1972 United Nations Conference on the Human Environment, the first world conference on the environment. It was so to say another historical event. Johannes Lundberg represented speleology in Stockholm, Bärbel Vogel could follow some discussions online.

The impression was that the discussions were similar, lamenting missed opportunities and that the political will for the much-needed reforms is still lacking. As an illuminating example, in the side event on the topic of "Vision for a responsible and sustainable minerals and metals sector" the discussions were dominated by the mining industry, but the important debate on recycling, e.g. of gypsum, was only briefly touched on once.

Speleology should follow and participate in these debates to enforce cave, karst and groundwater protection on national and international levels, in close collaboration with other like minded organizations. One of the big advantages of our passion is our global network and friendship, together with the inherently multidisciplinary nature of speleology. This can be used to send local experts to raise their voices on behalf of cave and karst protection in international political debates.

UIS could enforce its visibility and credibility by publishing a karst report on the global status of caves and karst through the help and data of its members. Collecting this UIS may also influence other NGO publications like the "Living Planet Report" of the WWF and strengthen cooperations.

The German Speleological Federation presents this year a list of disappeared caves in order to make visible what already was lost.

We all need to take sustainable development seriously. The circular economy must have a positive impact on nature. In the future companies will need the advice of conservation organizations.

Speleology must prepare for this future field of cave and karst protection.

For more information, please access:
https://regionalforum.unece.org/events/regional-forum-2022
https://www.unep.org/environmentassembly/unea5
https://www.stockholm50.global/
https://www.ilec.or.jp/en/news/

CAVES AT RISK

# ENDANGERED KENYAN COASTAL KARST CAVES

## *Chasimba: A Unique Karst and Cave Ecosystem at Risk in East Africa*

By Clive King (Kenya)
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## Background

The Cave Exploration Group of East Africa (CEGEA) was established in 1964 to explore, document, map, and report on the vast natural underground heritage of Kenya (http://www.cavinginkenya.com).

The group has done extensive work exploring the cave systems throughout Kenya including the cave systems formed in the Jurassic age (201-145 million years old), fossiliferous, Kambe Limestones and the more recent Pleistocene age corals (2 million -10,000 years old) of the coastal region.

The CEGEA is concerned about the protection of this natural heritage. The cave sites at Chasimba and Pangani lie beneath remnant fragments of coastal tropical forests that are under threat of being destroyed by agriculture, habitation, and industry.

These coastal forests rank first for their density of endemic plants and vertebrates out of the 36 most important global diversity hotspots (Mittermeier et al., 2009) which include at least 544 species of endemic plants and 53 endemic animals. These forests also comprise Kenya's only biodiversity hotspot (Woodhouse, 2020).

Recent botanical studies at both Chasimba and Pangani karst areas have identified at least 34 and 19 endemic plant species respectively (Woodhouse, 2021). Hidden within the Chasimba limestone rifts and often at cave entrances is the rare African Violet known as *Saintpaulia*.

These plants are specifically classified as *Streptocarpus ionanthus* subspecies *rupicola*. "Only three populations of this subspecies are known in the wild, only in Kilifi, and all of them are in danger of extinction," as noted by botanist Dr. Cornelius Kyalo (Koech, 5 May 2022).

## Location

The known cave sites are scattered along the Kambe Limestone Belt that parallels the Kenya coastline *(Figure 1)*.

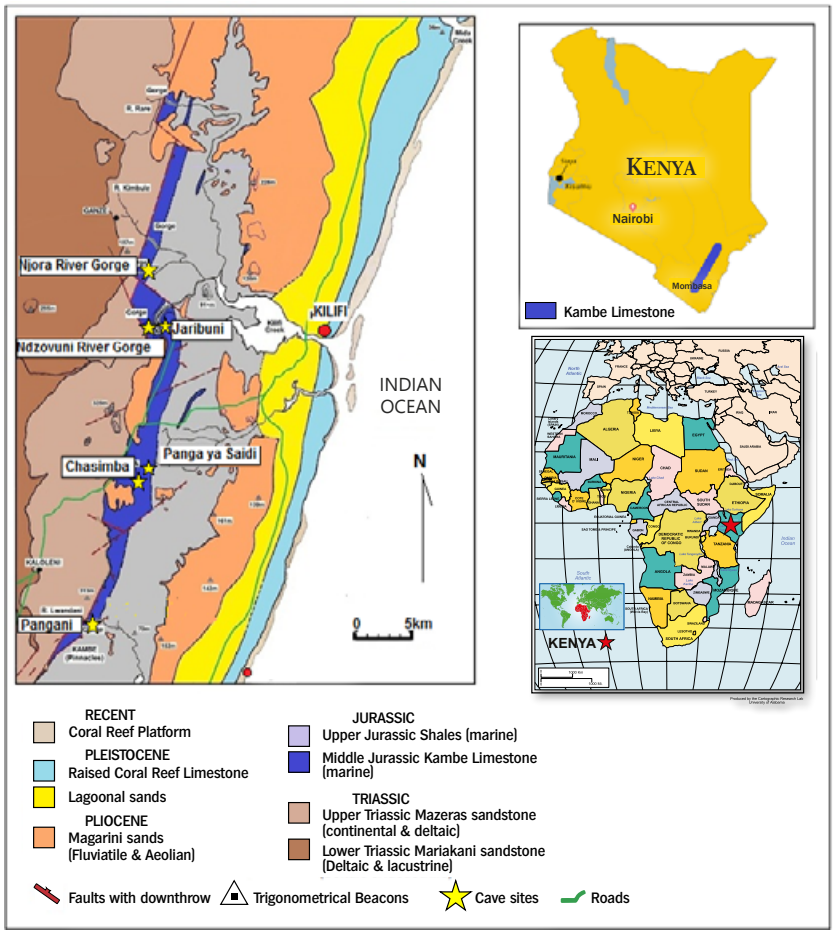


**Figure 1:** *Location map of the Kambe Limestone cave sites, Kilifi County, Kenya.*

The Chasimba Outcrop, covering an area of 0.1 hectare and rising to a height of 20 m above the surrounding landscape *(Photo 1)* is located adjacent to the main Kaloleni-Kilifi paved road. It sits at an elevation of 120 metres above mean sea level. Locally, it is referred to as "Mawe Meru" ("Black Rock").

Subsidence farming is being carried out around the limestone outcrop. Due to the karstic nature of the limestone buttresses and pinnacles, little activity other than trapping and tree cutting is done by the local inhabitants.

Due to the proximity of the outcrop to the main road, it has been the concern that the karst will one day be under threat from the road construction/quarrying groups that would see Chasimba as an easy mineable source of limestone.

## Value of the site

The Chasimba Outcrop block and the surrounding areas in the Kambe Limestone *(Figure 1)* have well developed cave systems that have taken millions of years to form from percolating ground and surface waters *(Figure 2)*. This has resulted in extensive subterranean passages *(Photo 2)* which display amazing speleothems (stalactites, cave curtains, pillars, etc.) *(Photo 3)*.

The caves are the home of a large colony of fruit (*Rousettus aegyptiacus*) and insectivore (*Coleura afra*) bats that are essential for the pollination of certain trees as well as controlling the insect population in the area. A myriad of insect life, symbiotic with the bat colonies as well as other subterranean cave dwelling insects, occur in the cave.

Besides the importance of the underground ecology, Chasimba and other caves sites within the Kambe Limestone are recognized for their biodiverse fauna and flora that flourishes on the outcrop. Many botanical studies have been undertaken at Chasimba especially on the endemic Africa Violet Saintpaulia *(Photo 4)*.

Panga ya Saidi Cave, located 4.5 km to the northeast from Chasimba, is the site of an important archaeological discovery. In 2017, the Museums of Kenya, in collaboration with the Max Planck Institute of Vienna, undertook an archaeological dig and discovered one of the earliest known organized burial sites in Africa dating to 78,000 years. This is one of the first major archaeological Stone Age burial sites discovered in the coastal caves.

Very little to no archaeological work has been undertaken at any of the other cave sites in the Kambe Limestone. The caves represent a huge potential for future archaeological discoveries to be made.

Pottery fragments have been noted from some of the caves in the Pangani caves attesting to early human habitation.

Many of the Pangani and Chasimba caves contain bone breccia sand fillings that have washed in from the surface and are now cemented by ferruginous calcrete.

Early vertebrate fossils have been noted in these karst fillings, but very little study has been undertaken on them.

Chasimba Cave, and many other cave sites in the Kambe Limestone, contain ancestral shrines that have been used, and in some cases are still being used, by the local herbalist practitioners.

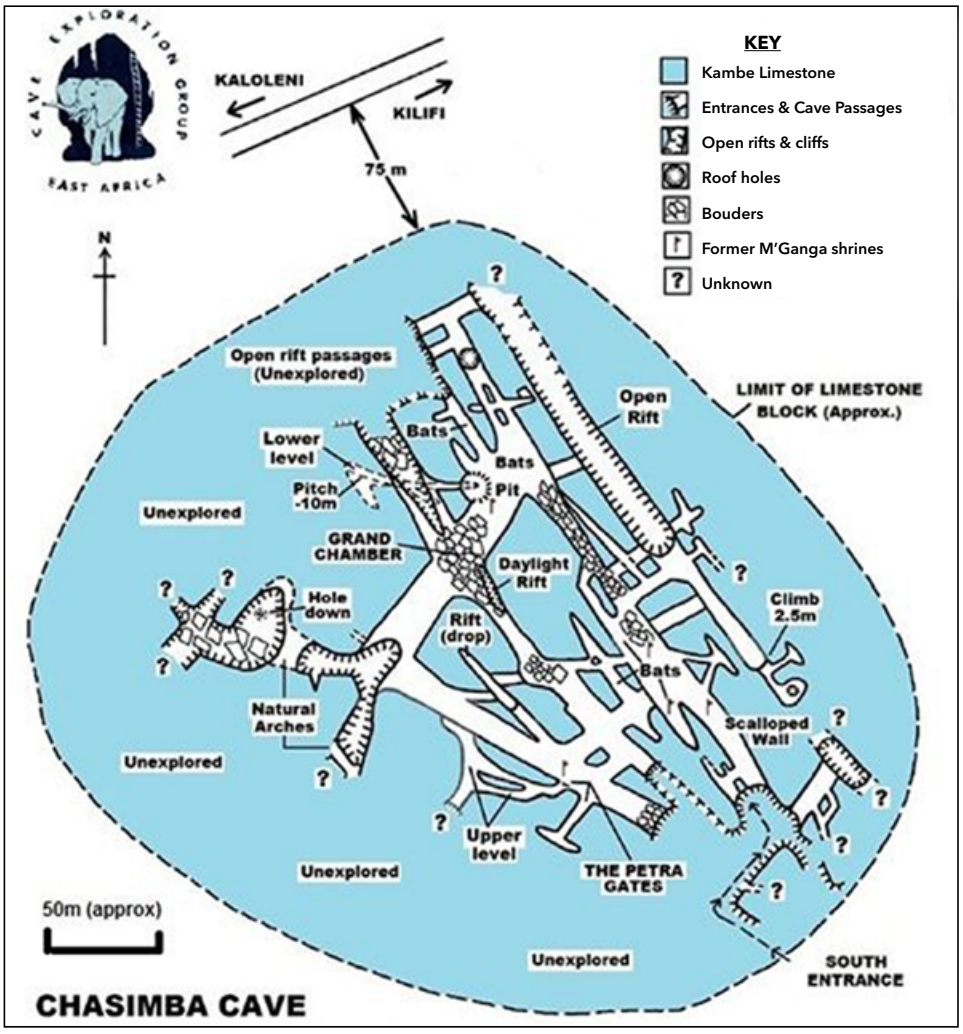


**Figure 2:** *Plan view of Chasimba Cave, the main cave system in the Chasimba Outcrop block (map prepared by the late Jim W Simons, Hon. Chairman CEGEA).*


CLIVE WARD, CEGEA

**Photo 1:** *The limestone buttresses of Chasimba ("Mawe Meru") showing the encroachment of agriculture up to the base of the cliff.*


FERDINANDO DIDONNA

**Photo 2:** *Entrance to Chasimba Cave.*

## The risk of quarrying and environmental protection actions

The CEGEA was alerted to a proposed quarry planned at Chasimba through the local Star Newspaper in May 2022 (Koech, 5 May 2022). The Group immediately established contact with Nature Kenya who was reported to be leading the charge for the protection of Chasimba based on the known indigenous and endemic plant species. The aim of the CEGEA was to make Nature Kenya aware that there was more at stake other than the surface fauna and flora and that the cave systems also play an important part to the conservation of Chasimba.

Various Conservation groups and other interested stake holders operating in Kenya were soon made aware of the proposed mining operations in the area. An Environmental Impact Assessment (EIA) had already been submitted to the National Environmental Management Authority (NEMA) for approval (Kamande et al., 2022) by the quarrying company prior to applying for a mining license from the Mines and Geology Department, Nairobi.

The report does not state whether the area under the EIA represents the same area that will be included in the mining license application. The EIA report was found to be lacking in many aspects. No mention was made of any of the scientific literature regarding the fauna and flora let alone the presence of caves in the area.

A serious omission in the report was that the grid references for the area under application were not stated. Approximate coordinates for the proposed mining area were deduced from the Google Earth map included in the report in order to establish the proposed boundaries in the field.

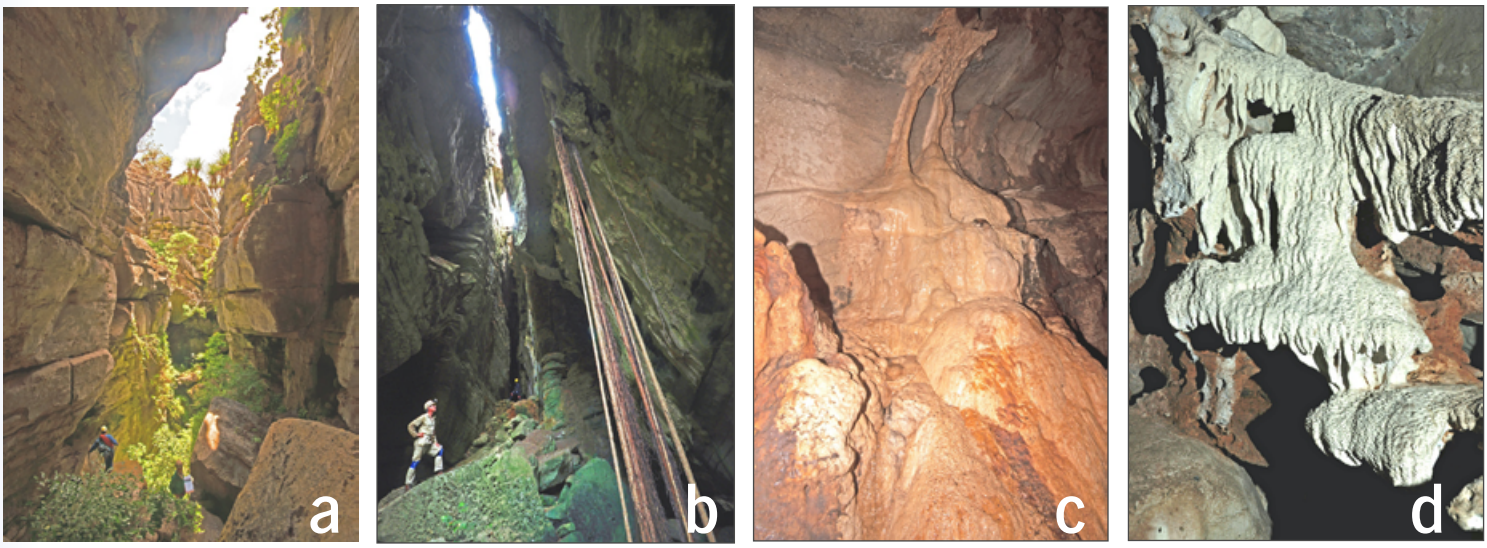


**Photo 3 (a)** *Entrance to Violet Valley, on the northern edge of the Chasimba Outcrop.* **(b)** *Tree roots extending down to the floor of the Chasimba Cave.* **(c)** *Flowstone covers the wall of the cave.* **(d)** *Flowstone forming cave curtains and mini stalactites adorning a ledge on the cave wall.* (Photographs by C. Ward, CEGEA).

From a follow-up field investigation, the proposed site lies some 180 m east of the Chasimba outcrop and commences from within the neighboring valley to the east. The area encompasses limestone outcrops and ridges.No cave or archaeological exploration has been done in the area. The valley areas are under maize cultivation whereas remnant patches of primary/secondary forest occur on the limestone ridges.

## Next steps

Nature Kenya has made a specific appeal to the Ministry of Petroleum and Mining, the Ministry of Environment, the Ministry of Sports, Culture and Heritage, the Ministry of Tourism and Wildlife, the National Environment Management Authority, and the County Government of Kilifi to stop this move to extinction (Mwacharo, 2 June 2022).

For now, the Chasimba Outcrop ("Mawe Meru") is not in immediate danger of being destroyed by the proposed quarry. However, it is not known whether future blasting in the quarry will have a detrimental effect on the caves and the bat colonies.

In the meantime, an awareness initiative is being implemented with the local residents that farm around Chasimba, to create Chasimba as a tourist site as the first steps toward protecting the outcrop. A visitor's book has been provided to the landowner who resides adjacent to the main paved Kaloleni-Kilifi Road. He is prepared to act as a guide to show tourists the Chasimba Cave.

It is hoped in time, that through the Museums of Kenya, Nature Kenya, and other conservation NGOs, that the Chasimba Outcrop and other important fauna, flora, and cave areas in the Kambe Limestone, especially Pangani, will be protected as heritage sites in order to deter any future mining on these unique and sensitive ecological areas.

CLIVE WARD, CEGEA

**Photo 4:** *The African Violet Saintpaulia whose home is on the rocky nooks and crannies of the Chasimba ("Mawe Meru") Outcrop.*

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..... (April 2021) - The importance of coastal Kenyan isolated hill forest outliers and limestone outcrops to botanical conservation in East Africa. Davis Expedition Report, University of Edinburgh, p16.

IN MEMORIAM

# ROBBY KO KING TJOEN

## *Father of Indonesian Caving*

***Indonesia, 4 January 1936 – 20 June 2022***

by Jean-Pierre Bartholeyns (Belgium)
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**Robby Ko in 2016:** *his enthusiasm for caves and a great deal of dedication have influenced generations of cavers in Indonesia.*

The founding pillar of Indonesian speleology, **Dr. Robby Ko King Tjoen** left us on the morning of June 20, 2022, at the age of 86 in Bogor, West Java, Indonesia. He was buried in San Diego Hills, Karawang. Robby, born in Magelang on January 4, 1936, was the second son of Ko Khoen Gwan, production manager and shareholder of "Ko Kwat Ie" cigar factory in Magelang, Central Java, Indonesia.

Recognized as the father of Indonesian speleology, Robby graduated from the Faculty of Medicine at the University of Indonesia. He completed his undergraduate studies in 1962 and completed his training as a specialist in skin diseases (FKUI) at the same alma mater in 1966.

His passion for caves began when he entered Sripit Cave in Trenggalek, East Java, in 1973. Fascinated by the beauty of the cave, he pondered what he should do next. Realizing that since the beginning of the 19th Century, the caves and their environment were recognized at the international level, as having real scientific value, he felt that they should therefore be studied to be preserved.

Through the Federation of Indonesian Speleological Activities (FINSPAC), through his research, visits, scientific conferences, organization and/or participation in/at various scientific meetings at the local and national level, his travels abroad, and the courses he followed there, "Dr. Ko," as those who knew him called him, was a true pioneer because, at that time, speleology and karstology were neither known nor practiced in Indonesia.

He was therefore almost totally self-taught in his vast speleological knowledge and of their sciences which enabled him to study caves and the karstic environment with a more marked penchant for karstology, what has become bio-speleology, karst conservation, and tourism in caves. Since then, "Dr. Ko" was considered in his country an expert in the sciences related to speleology.

In 1983, because he was considered the most qualified person in Indonesia, he was elected the official representative of Indonesia to the International Union of Speleology (UIS).

From 1986 to 2000, he was indicated as Delegate for Indonesia to the UIS. In 1997, during the 12th International Congress of Speleology (ICS) he was elected as UIS Adjunct Secretary for the period 1997-2001. He had already attended the 11th ICS (China 1993).

Robby Ko was also elected President of the Indonesian Federation of Speleological Activities, founded on May 23, 1983, in Cilacap by seven speleology enthusiasts.

He wrote some 150 articles in the fields of caving, sedimentology, hydrology and karstic geology, bio-speleology, archaeo-paleontology, conservation, underground tourism management, teaching caving, cave exploration techniques, management of karstic areas, and karstic vegetation. As an expert, Robby Ko King Tjoen was the contact person for various government agencies, and universities, as well as IUCN for karst and cave-related issues.

In 2016, I had the pleasure and the good fortune, as he is a very busy man, to have a long one-on-one interview with Dr. Ko. In good shape despite his 80 years, he still practiced as a dermatologist and specialist in venereology.

In 2014, his passion for caves was suddenly limited. Visiting a cave at Sukolilo, in the center of Java, he suffered a stroke because he forgot to take his blood pressure medication. Afterward he had to use a cane, but his continued enthusiasm and his will to protect Nature, and caves and karst in particular, were illustrated by vivid memories.

Always dynamic and cheerful, Dr. Ko, with his very direct and humorous speaking style, called himself

a "weird" man and would add, with a broad smile, "My zodiac sign is Capricorn, and the Capricorns are stubborn and boring people."

Wishing to remain single, he had adopted four children of his driver, who all been successful in their carrier as medical doctors (Mrs. Dr. Euis Maryani, Cardiovascular Thorax Surgery Specialist), and the others running as businessmen. He had concluded that the Indonesians were all intelligent!

So realistic and topical, some of his words and actions will remain etched in my memory, no doubt because I am a teacher by profession and by vocation. What must be inculcated in education is to raise awareness. Personal interest then takes over.

Calling himself an always curious person, he thought others were too. Thus, from 1980, Dr. Ko brought together young people interested in cave exploration in his home. His obvious goal was to pass on his knowledge and introduce people to the world of caves and train the next generation. At an event in 2016, I saw him get up first to congratulate, support, advise, and encourage young cavers to continue their research.

Mother Nature and her daughters, the caves, are very complicated. His method was to study them section by section. If you master a part of it even perfectly, he advised, do not boast of knowing Nature. The evolution of our knowledge about Nature or Health will only progress if their study is approached in a holistic, multidisciplinary, and interdisciplinary way and not piecemeal.

To conclude our interview, he told me relaxed and smiling: *"...the cave is like a very thick book whose pages we haven't finished turning!" "...I did and gave everything I could!"*

CAHYO RAHMADI

**August 2014:** *Dr. Robby Ko King Tjoen at home, in his office - Bogor, West Java, Indonesia.*

## Message from the Indonesian Speleological Society

Mas Robby, as we call him. We got to know each other back then when we were students of universities from all over Indonesia.

The venereo-dermatologist by training and self-taught speleologist have introduced us the nature enthusiast students to the caves and its sciences. His passion, eagerness, and enthusiasm have brought us understandings of the relationships of cave ecosystem, its genesis, and its benefits to the human being in a broader sense.

He was tirelessly lead us the juniors to become mature human beings with holistic mindset and highly dedicated persons in carrying out our duties and responsibilities.

Good by mas Robby, may you enjoy your eternal cave exploration!

IN MEMORIAM

# AVIRMED ERDENEDALAI

***Mongolia, 20 December 1958 – 21 June 2022***

by Satoshi Goto (Japan)
*UIS Adjunct Secretary*
goto@tokyospeleo.jp

*Source:* https://igg.ac.mn/


*PhD in Geological Sciences, cave explorer Erdenedalai Avirmed died at age 64.*

Avirmed Erdenedalain, a leading Mongolian scientist, Doctor of Geography and Cave Researcher, passed away suddenly on June 21, 2022. Friends, colleagues, and disciples suffered irreparable loss.

Avirmed Erdenedalai was born on December 20, 1958 in Munkh Saridag, Gurvan Uliastai, Khaliun soum, Gobi-Altai province. In 1967-1975, he attended the 8-year secondary school in Khaliun soum. In 1975-1977, he graduated from the 1st 10-year secondary school in Altai, and in 1977-1981, he graduated from the National University of Mongolia with a degree in Geography and Cartographic Engineering.

Avirmed was an engineer at the State Geodesy and Cartography Department in 1981-1984, a teacher at the Construction Technical School in 1984-1985, a researcher in the field of cartography at the Institute of Geography and Permafrost Research of the Mongolian Academy of Sciences in 1985-1993. He worked as a researcher in the field of Physical Geography of the Institute, and in 1994-2006 he was the executive director of "Gazar Holding" LLC and "Gazar Trade" LLC.

In January 2007, he returned to the Physical Geography Sector of the Institute of Geography of the Mongolian Academy of Sciences (as it was then called) as a leading researcher and head of the Institute's Department of Physical Geography and retired in 2020.

He had worked in the public and private sectors for 39 years (13 years in the private sector, 26 years in science and education), including 21 years at the Institute of Geography and Geoecology. During his tenure, he participated in the development of several maps, including "Limestone Distribution Map of Mongolia."

E. Avirmed received his PhD in Geography in 1999 under the supervision of Academician Sh. Tsegmid on the topic of "Origin and distribution of caves in Mongolia."

He was a researcher who published a series of monographs entitled "Mongolian Caves" and disseminated knowledge about cave studies, and the origin, features, and types of caves in Mongolia to the public. In addition to writing three joint books and brochures, he had edited more than 10 monographs on the same topic, wrote more than 60 scientific and advertising articles individually and jointly, both in foreign and domestic publications.

He had published 22 maps and three academic atlas (jointly) for international and domestic scientific publications, as well as more than 20 papers were discussed at the analysis conference, two of which were copyrighted on maps and one on monographs.

During the last 40 years of his career, he organized many cave research expeditions in Mongolia within the framework of Physical Geography and Environmental Studies of the Institute of Geography and Geoecology of the Academy of Sciences and in cooperation with the International Cave Research Association. As as result, 335 caves were surveyed.

Among his awards, we have the title of Master of Sports (2001), the Certificate of Merit of the Ministry of Education, Culture and Science (2008), the Sports Glory Medal (2011), Leading Researcher title (2011), Leading Environmental Worker title (2013), and in 2017 he was awarded the title of "Top employee of the Department of Land Management, Geodesy and Cartography".

E. Avirmed was the Delegate from Mongolia to the UIS and President of the Mongolian Association of Cave Studies.

Your hard work, role model, honest diligence, friendly character, modesty, and saintly image will be forever in our hearts and forever remembered by our family, brothers, relatives, friends, and colleagues.


*Erdenedalai (left) and his son Choijindash Avirmed in 2013.*

# Calendar of Events 2022 2023

**If you are interested in any of the following events, contact them directly to learn if they are still planned as announced below**

## Climate Change, The Karst Record IX (KR9) Conference
**17-20 July 2022** (Innsbruck, Austria)
https://www.uibk.ac.at/congress/kr9/

## 25th International Conference on Subterranean Biology
**18-22 July 2022 (Cluj-Napoca, Romania)**
https://www.25icsb.com/

## 18th International Congress of Speleology
**24-31 July 2022** (Savoie Technolac, Le Bourget-du-Lac, Savoie, Chambéry, France)
http://uis2021.speleos.fr/

## 27th International Cave Bear Symposium
**1-4 September 2022** (Golling ander Salzach, Salzburg, Austria)
https://www.museumgolling.at/forschung/icbs2022/

## 14th EuroSpeleo Forum + XI Congreso Español de Espeleología
**5-11 September 2022** (Cantabria-Burgos, Spain)
https://eurospeleo2022.com

## Man and Karst Conference
**12-17 September 2022** (Sicily, Italy)
https://cirs-ragusa.org/blog/man-and-karst-2022/

## International Show Caves Association and US National Caves Association Congress
**21 September to 1 October 2022** (San Antonio, Texas, USA)
https://caves.swoogo.com/congress22

## 15th European Cave Rescue Meeting
**29 September – 2 October 2022** (Rudice/Moravian Karst, Czech Republic)
https://caverescue.eu/tag/15th-european-cave-rescue-meeting/

## Importance, State of the Art, and Prospective of Utilization and Protection of Resources in Karst
**21-22 October 2022** (Belgrade, Serbia),
http://www.karst.edu.rs/en/index.html

## 20th International Symposium on Vulcanospeleology
**22-26 November 2022** (Dak Nong Province, Vietnam)
https://20isvdaknong.com/

## 17th Multidisciplinary Conference on Sinkholes and the Engineering and Environmental Impacts of Karst
**27-31 March 2023** (Tampa, Florida, USA)
http://www.sinkholeconference.com/

## Clay Minerals Society Conference: *Karst Trip and Session*
**20-25 May 2023** (Austin, Texas, USA)
https://cvent.utexas.edu/event/b8822615--d0e8-4730-89e4-2ef519cbeb5b/summary

## 14th International Symposium on Pseudokarst
**22-26 May 2023** (Sudetes, Poland)
https://14pseudokarst.wonders4you.com/

## 37th Brazilian Congress of Speleology
**26-29 July 2023** (Curitiba, Brazil)
https://www.cavernas.org.br/37-congresso-brasileiro-de-espeleologia/

## US National Speleological Society Convention
**26-30 July 2023** (Elkins, West Virginia, USA)
www.caves.org

## 19th International Congress of Speleology
**20-27 July 2025** (Belo Horizonte, Minas Gerais, Brazil)
***for preliminary information see volume 63-1 of the UIS Bulletin at***
http://uis-speleo.org/wp-content/uploads/2021/07/uisb631.pdf

# UIS BUREAU 2017/2021

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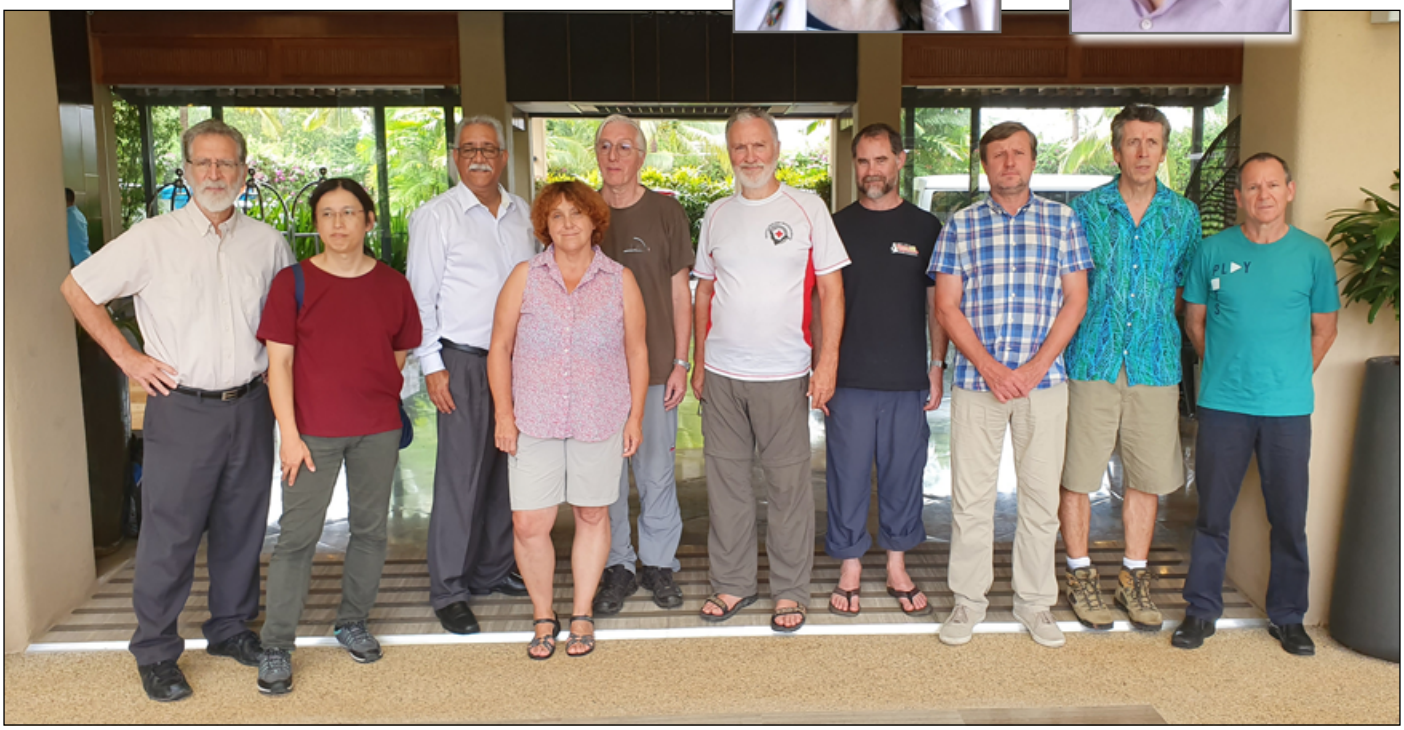
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## UIS BUREAU 2017/2021 in Bohol, Philippines, September 12, 2019.

***Left to right:*** **George VENI** *(President/USA);* **Satoshi GOTO** *(Adjunct Secretary/Japan);* **Efrain MERCADO** *(Vice-President of Operations/Puerto Rico);* **Nadja ZUPAN HAJNA** *(Treasurer/Slovenia);* **Mladen GARAŠIĆ** *(Adjunct Secretary/Croatia);* **Gyula HEGEDUS** *(Adjunct Secretary/Hungary);* **Tim MOULDS** *(Adjunct Secretary/Australia);* **Zdeněk MOTYČKA** *(Vice-President of Administration/Czech Republic);* **Bernard CHIROL** *(Adjunct Secretary/France), and* **Nivaldo COLZATO** *(Adjunct Secretary/Brazil).* ***Inset photos above:*** **Bärbel VOGEL** *(Adjunct Secretary/Germany);* and **Fadi NADER** *(Secretary General/Lebanon).*

Union Internationale de Spéléologie
www.uis-speleo.org

# LIST OF MEMBER COUNTRIES

## as reported by the UIS Treasurer

## Total: 53 Members

## UIS FEES - JUNE 2022

### PAID THROUGH

**Australia** (2024)
**Austria** (2021)
**Belgium** (2022)
**Bosnia and Herzegovina** (2021)
**Brazil** (2021)
**Bulgaria** (2022)
**Canada** (2021)
**China** (2021)
**Colombia** (2021)
**Costa Rica** (2021)
**Croatia** (2021)
**Cuba** (2024 and half for 2025)
**Czech Republic** (2022)
**France** (2021)
**Germany** (2022)
**Greece** (2021)
**Hungary** (2022)
**Italy** (2022)
**Japan** (2021)
**Lithuania** (2021)
**Luxembourg** (2021)
**Mexico** (2022 and half for 2023)
**Norway** (2022)
**Netherlands** (2022)
**Philippines** (2022)
**Poland** (2022)
**Portugal** (2024)
**Romania** (2021)
**Serbia** (2023)
**Slovakia** (2022)
**Slovenia** (2022)
**South Africa** (2022)
**South Korea** (2023)
**Spain** (2021)
**Sweden** (2022)
**Switzerland** (2022)
**Ukraine** (2021)
**USA** (2021)

## UIS MEMBERS WITH DEBTS FOR 2020 OR MORE (LAST PAYMENT):

**Algeria** (2013; *at next Congress*)
**Argentina** (2019; *at next Congress*)
**Honduras** (2013)
**Indonesia** (2017; *UIS Bureau decision: postponed the payment 2022)*
**Iran IR** (2020)
**Israel** (2017; *at next Congress*)
**Kyrgyzstan** (2018)
**Lebanon** (2017; *UIS Bureau decision: not paying until 2021 due to economic crisis)*
**Mongolia** (2017; *paid 4 years in 2018*)
**New Zealand** (2020)
**Puerto Rico** (2020)
**Russia** *(2017; frozen UIS membership)*
**Turkey** (2020)
**United Kingdom** (2020)
**Vietnam** (2017; *at next Congress or other way*)
**Venezuela** (2017; *UIS Bureau decision: not paying until 2021 due to economic crisis)*

## REQUESTS FOR UIS MEMBERSHIP IN ALPHABETICAL ORDER:

**Armenia** *(paid for 2022 and 2023),* **India** *(not paid yet),* **Libya** *(not paid yet),* **Malaysia** *(not paid yet), and* **Morocco** *(not paid yet).*

Please indicate WHO is paying for your country—especially if there are two or more speleological associations in your country. The UIS Bureau can't select the payer for your country and we don't return money!!!

If you have a new treasurer or responsible person for payments, please send the new name and e-mail address to zupan@zrc-sazu.si.

We do not know who to contact in some countries or we do not have their proper address.

**UPDATE your status now!**

CONTACT UIS

UNION INTERNATIONALE DE SPÉLÉOLOGIE
www.uis-speleo.org
Titov trg 2, 6230 Postona, Slovenia

***If there are any irregularities, or if you have not found your country in this list, please, ask the UIS Treasurer***

FINANCE

# ANNUAL CONTRIBUTIONS

By Nadja ZUPAN HAJNA (Slovenia), *UIS Treasurerry* - zupan@zrc-sazu.si



*Prof. Dr. Nadja ZUPAN HAJNA (Slovenia), UIS Treasurer.*




*Headquarters of the Karst Research Institute in Postojna, Slovenia, where the offices of the UIS are located. In the detail, the bronze plaque with the emblem of the UIS affixed below the name of the institute.*

The UIS General Assembly at the 17th International Congress of Speleology *(Sydney, Australia, 2017)*, approved the amended fee categories of member countries, which are based on the number of speleologists in the national organization or organizations that represent the country to the UIS.

The new annual contributions are as follows, starting after the 17th ICS, Sydney, Australia:

Category A: 2,000 speleologists or more ..... 480 Euros
Category B: at least 1,000 but fewer than 2,000 ..... 360 Euros
Category C: at least 100 but fewer than 1,000 ..... 240 Euros
Category D: less than 100 ..... 60 Euros

If the fees are not paid for more than five years, the Member Country will lose its membership in the UIS.

The UIS Bureau may reduce or waive the fee of a Member Country if the Member Country makes a written request describing the reasons why it is having difficulties making its payments and how long those difficulties are expected to continue. All fee payments and related communications are conducted between the UIS Treasurer and the Member Countries.

## UIS BANK ACCOUNT

**Account name**
Mednarodna speleološka zveza-UIS
Titov trg 2
6230 Postojna - Slovenia

**Account Nº**
IBAN SI56 1010 0003 7861 520

**SWIFT Code:** BAKOSI2X

**Bank *(name and address)***
Intesa Sanpaolo Bank d.d.
Traška 2 - 6230 Postojna - Slovenia

**Accepted Currencies:**
EUR (Euros)

## STATE OF UIS BANK ACCOUNT ON JUNE 30 2022

**EUR - Account balance = 37,543.53**
**USD - Account balance = 50,882.33**

# EDITOR'S DISCLOSURE

Before submitting articles, please, refer to the

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- typographical mistakes

Every effort possible has been made to keep all articles as close to the original version. In some cases, the editors review the structure in order to present the article in a clear and consistent manner and obvious errors are corrected if found.
We appreciate your understanding.

Should you have any question or comments, please send them to:

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UIS BULLETIN

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