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Morphology and hydrogeology of Gruieșului cave (Pădurea Craiului Mountains)

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Abstract. Gruieșului cave from the Pădurea Craiului Mountains with a total length of 630 m is the resurgence of the great cave Hârtopul Bonchii (development: 6,668 m). Gruieșului cave is focused on an underground river of 235.6 m length, above which, in the final sector, a superior ascending level develops. The cave contains the most various concretions being from this point of view one of the most beautiful ones in the Pădurea Craiului Mountains. At present, the Speleological Club “Z” works together with the Town Hall of Roșia commune, Bihor county, on a preliminary project of touristic arrangements of the cave. But an arrangement which must respect the natural subterranean landscape.

Introduction

Gruieșului cave is situated on the left side of the Ștezelor valley, Roșia area (Fig. 1), central zone of Pădurea Craiului Mountains, at an absolute height of 395 m and at a relative height of 30 m. The stream coming out of the cave forms several small waterfalls on travertine deposits before flowing into the Ștezelor valley.

History of explorations

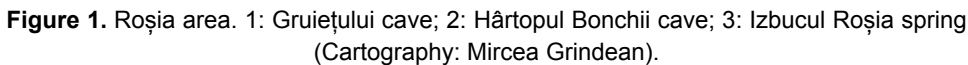
In the upper level, the author identified in 2019 a signature dating from 1936. Gruieșului cave was signaled by P. A. Chapuis and R. Jeannel in 1951 under the wrong toponym of the Fleazelor Valley cave, then T. Orghidan and collaborators in 1965, under the name of Șteazelor Valley cave or Poniței cave (Fig. 2). Iosif Viehmann, Gheorghe Racoviță and Teodor Rusu surveyed the active level in the same year 1965, but their map was never published. The terminal sump have been successively dived first by the late Petru Brijan (1984) and then by the French diver, Stéphane Lips, 2007. But after 10 meters they abandoned because of the very oozy water. In 1986, Emil Silvestru and Viorel Lascu made up a more precise map for 414 m. In 2014, a common team of the speleological clubs “Z” (Liviu Vălenaș) and “Speodava” Ștei (Robert Kovács and Lavinia Cozma) restarted the exploration of the cave, discovering the Kovács/Merinu Gallery. In 2019, a team of the Speleological Club “Z” (Liviu Vălenaș and Alexandrina Trif) and “Cristal” Oradea (Péter Merinu) made an almost complete exploration and they achieved a precise survey for 630 m of total length and + 50.2 m of vertical range. The map was officially presented at the Speleological European Forum in Sofia, Bulgaria in September 24-29, 2019 (Fig. 3).

Lithology, morphology, genesis and hydrogeology

The cave develops in strongly diacized and faulted Jurassic limestones. Excepting the first 10 m, the principal gallery, crossed by an underground river, is quasi horizontal up to the terminal sump. But before the sump, an upper level develops, which is totally different morphologically from the rest of the cave. It is continuously ascending, reaching in all a level difference of 43.6 m. It is also the best concreted sector of the cave. The cavity, as a resurgence of Hârtopul Bonchii cave, was initially formed in epiphreatic regime, the upper level included. This was the first drain of Hârtopul Bonchii cave, then the whole cave was vadose remodelled. On the upper level, five old more important caves are preserved with dry waterfalls. The subterranean course flowing through the cave never dries, it has a flow of few litres per second but at flooding times it can exceed 100 l/s (Figs. 4, 5).

Description

From a relative great portal 15.6 m wide and 6.6 m high, after a short ascending sector where the stream forms small waterfalls, it penetrates the Entrance Hall, largely lit, with the dimensions of 30×18×16.5 m. The hall houses a bats colony. After a short narrowing the gallery is linked to the Great Hall (58×17×17 m) which



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Figure 2. The entrance of Gruieţului cave and the Entrance Hall (Photo Liviu Vălenaş, 2014)

sump), where are four more important laterals, out of which one is concretioned 68.5 m long (Figs. 7 - 8). The way gets low onward with the ceiling up to 0.6 - 0.5 m high. From a small hall with a circular formation resembling a pumpkin (Fig. 9), after 23.6 m it is linked down to the terminal sump (10 m length and 6 m depth, Stéphane Lips, 2007). Its diving temptations have successively failed because of the extremely oozy water. From the “pumpkin” on the left, an ascending slide starts, 23 m long, in a great slope leading to a very beautiful suspended lake with crystal clear water (Fig. 10). After it, the gallery gets lowered and after a vertical of 4 m, it opens in a hall of 18×7.5×11.4 m (Fig. 11). The climbing of a huge stalagmite waterfall flow 7 m high (Fig. 12) led to the discovery of a low concretioned gallery in 2014 with a total length of 42 m, which was not completely explored. It is the only question mark (except the terminal sump) which still remains for this cave morphology. From the last hall, after two ascending verticals of 2 and 1.5 m respectively, a gallery opens into the Terminal Hall (34×15×14 m) (Fig. 13). On the left, a narrower ascending gallery bifurcates into two branches ending through closed chimneys, the one of 8.5 m high reaches the maximum level of the cave of +50.2 m.





Figure 4. The active of the cave between the Entrance Hall and the Great Hall (Photo Liviu Vălenaș, 2014).



Figure 5. The underground course in the Great Hall (Photo Liviu Vălenaș, 2014)



Figure 6 (up left). Stalagmite formation in the Great Hall (Photo Liviu Vălenaș, 2014).
Figure 7 (up right). Stalactite formations in the active course (Photo Liviu Vălenaș, 2019).
Figure 8 (bottom). The active course in the terminal sector (Photo Liviu Vălenaș, 2014).

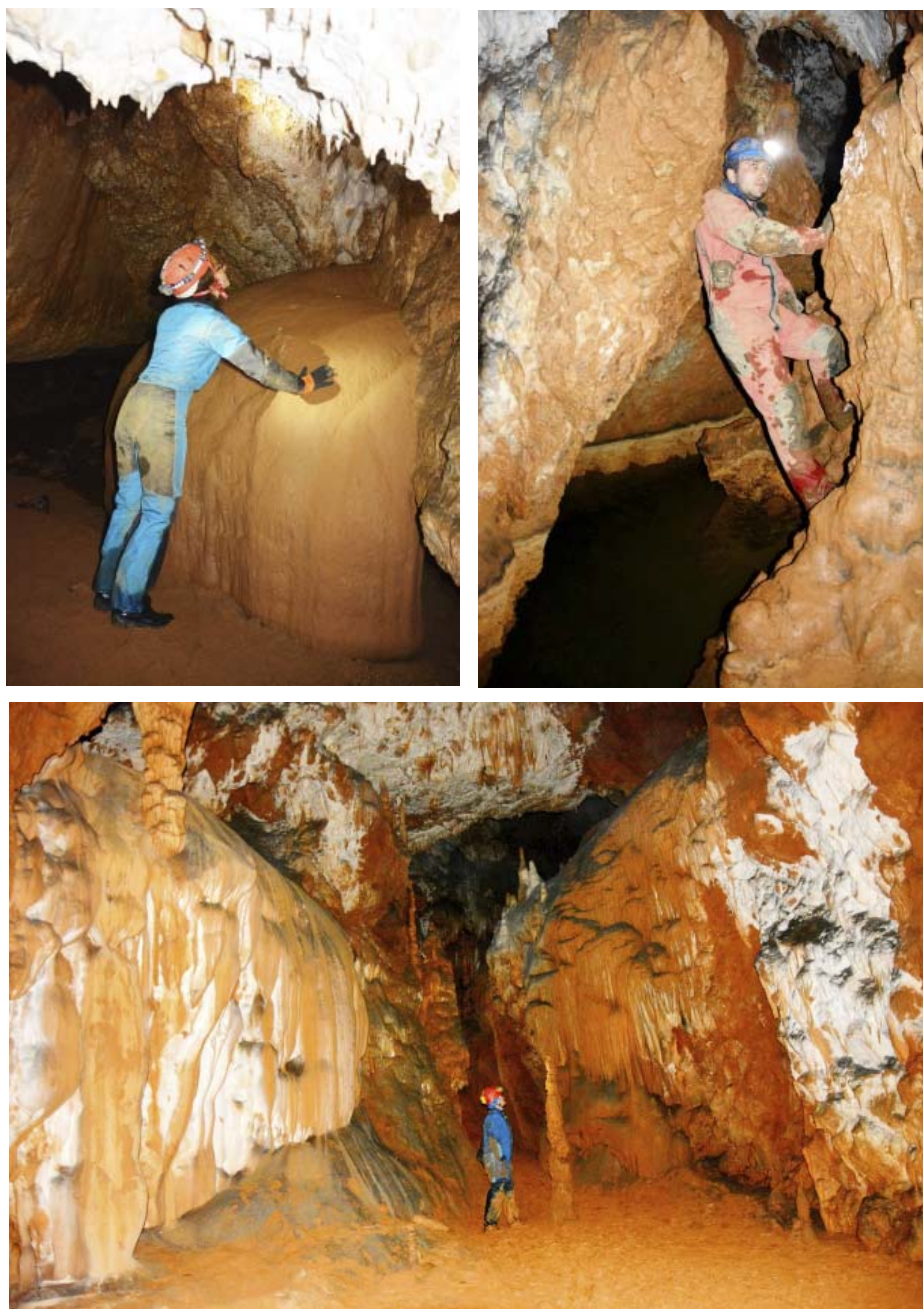


Figure 9 (up left). The “pumpkin “in the active terminal sector (Photo Liviu Vălenaș, 2019).

Figure 10 (up right). The suspended lake in the slide (Photo Liviu Vălenaș, 2014).

Figure 11 (bottom). The hall of $18 \times 7.5 \times 11,4$ m in the upper level (Photo Liviu Vălenaș, 2014).



Figure 12. The stalagmite waterfall and the beginning of Kovács/Merinu Gallery from the upper level (Photo Liviu Vălenaș, 2014).



Figure 13. Stalagmite formations and calcite crystallizations in the Terminal Hall from the upper level (Photo by Liviu Vălenaș, 2014).

Comments

Mineralogy

Gruiețului cave contains the whole range of classical concretions and on the ceiling and on the walls of the upper level, calcite crystallizations develop.

Biospeology

The cave houses a bats colony which in 2014 stayed in the Great Hall and in 2019 in the Entrance Hall.

Possibilities of advance

The best possibility of advance in the future is on Kovács/Merinu Gallery in the upper level, a very low gallery which was not forced to the end in 2019 either but it continues towards Hârtopul Bonchii cave.

Details concerning Gruiețului cave survey

In 2014, the Speleological “Z” Club started reexploring and resurveying Gruiețului cave, Roșia, in the Pădurea Craiului Mountains. The new map are: 630 m development, + 50.3 m vertical range (VR), 230.7 m extension. If through developing Gruiețului cave it is only a medium cave in the endocarst in the Pădurea Craiului Mountains, in exchange, through the positive vertical range, it is one of the most important remountant caves in these mountains. The total length of 630 m is displayed in the following way: the active gallery (entrance - terminal sump) 235.6 m, laterals and loops on the active gallery 170.1 m, upper level 123.1m, laterals and loops on the upper level 101.2 m. The new survey was made with the technical means of the year 2019 (disto Leica etc.). But a new technique was also used, the one used by the Speleological Club “Z” ever since 2015 in Laos, achieving tens of photos and video films on the whole length of the cave. This allowed the achievement of a map and the sections with several details.

Observations concerning the old surveys

The first map was made (but only for the active gallery, without the laterals) by I. Viehmann, G. Racoviță and T. Rusu in 1965. The map was never published, that is why we do not have any comment. In 1986 Emil Silvestru and Viorel Lascu made a new map, this time the upper level was partially surveyed. The given development was 414 m and the vertical range +20.35 m. The drawing is relatively simple, the laterals on the left of the subterranean river schematically sketched and incomplete and the upper level wrongly oriented in the final sector. But the major mis-

takes are those concerning the level calculations. The 1986 team considered the 0 level the Entrance hall, which was wrong. The 0 level is under the portal, the lowest point. From here, the active, which makes small waterfalls and rapids, arises up to the entrance hall of 4 m vertical range. But the most serious error is the calculation of the vertical range of the upper level. The level of +20.35 m is absurd. Only the access slide (with a slope between 30 and 85 degrees) is 23 m long, reaches a vertical range of 14.75 m. In continuation the way is constantly ascending, sloping, having also four ascendant verticals of 4 m, 2 m, 1.5 m and 2 m respectively, and at the end a chimney in "the bottom of the sack" 8.5 m high (which was not climbed by those nominated earlier and neither did they climb the 7 m vertical leading to Kovács/Merinu gallery). The extension given by E. Silvestru and V. Lascu was 235 m, a small difference compared to the present mapping (230.7 m extension) is caused by the wrong orientation of the terminal hall in the upper level, an error belonging to E. Silvestru and V. Lascu.

Acknowledgments

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