Mehedinti Mountains: The Cave from Mohilii Creek (Ascunsă Cave)

Virgil Drăguşin, Marius Vlaicu, and Emilian Isverceanu

Abstract

Ascunsă Cave is situated in the Mehedinţi Mountains and is part of the Isverna cave system. The cave was discovered in the late 1970s by members of the Focul Viu Caving Club, who surveyed the first 13.5 m of it. Since 2008, the "Emil Racoviţă" Institute of Speleology and the Underwater and Cave Exploration Group explored and surveyed 691 m of passages totaling 185 m of vertical development. Studies based on stalagmites from this cave revealed the climate evolutions during the last glacial cycle.

Keywords

Contact cave • CO_2 monitoring • Mehedinţi Mountains Romania

Geographic, Geologic, and Hydrologic Settings

The cave is located on the eastern side of the Mehedinţi Mountains (Fig. 1) and is part of the Isverna cave system, with its underground river being a tributary of Isverna Cave (Povară 2012). Between the closest points of the two caves, there are two kilometers in a straight line, implying a mature underground network. The cave is developed at the contact between Turonian–Senonian wildflysch (mélange) and the overlaying Upper Jurassic-Aptian limestone (Codarcea et al. 1964). Ascunsă is a temporary stream cave, functioning as a sinking stream (ponor) of the Mohilii Valley but also having its own underground river that appears in the White Chamber (Sala Albă) along the Tributary Passage (Galeria Afluentului). Drăguşin et al. (2017) showed that this tributary drains a mixed aquifer and is not infiltrating from the nearby creek.

History of Exploration

The cave was first reported by members of the Focul Viu Caving Club in the late 1970s, when it was surveyed on a total length of 13.5 m (Goran 1981). In August 2008, V. Drăguşin and E. Isverceanu blocked (redirected) the water of Mohilii Creek from entering the cave and in September of the same year E. Isverceanu, R. Băncilă, and A. Crânguş explored most of the new part of the cave. In October 2008, during the initial survey of the cave, E. Isverceanu reached a small sump on the Girls' Passage (Galeria Fetelor) at ~160 m below the entrance level. Because it was too small to dive a decision was taken to dig a hole through the wall to bypass it. This work lasted throughout 2008 and until August 2009 and was done mainly by V. Drăguşin and E. Isverceanu with the help of T. Marin, V. Voiculescu, M. Baciu, and M. Robu. After the bypass, E. Isverceanu and E. Buduran reached another end point in September 2009, where the passage was filled with sediments. Throughout 2009–2012, work was done in order to facilitate the access to the new end point. Located in a very narrow part of the cave, the excavated sediment could not be easily deposited, hindering progress. The work at this end point was completed with the help of E. Buduran, I. Axinte, I. Mirea, G. Ruică, and C. Cojocaru. Finally, in 2013 V. Drăguşin and A. Crânguş managed to pass through and crawled for another 6–7 m, up to a point where a large stalactite is blocking the passage. The exploration is still ongoing, with the goal to remove the stalactite and lower the water level beyond it, which stands at about 5 cm below the ceiling.

V. Drăguşin (✉)
"Emil Racoviţă" Institute of Speleology, Romanian Academy, Frumoasă 31, 010986 Bucharest, Romania
e-mail: virgil.dragusin@iser.ro

M. Vlaicu
"Emil Racoviţă" Institute of Speleology, Romanian Academy, Calea 13 Septembrie 13, 050711 Bucharest, Romania

E. Isverceanu
Underwater and Cave Exploration Group (GESS), Frumoasă 31, 010986 Bucharest, Romania

G. M. L. Ponta and B. P. Onac (eds.), *Cave and Karst Systems of Romania*,
Cave and Karst Systems of the World, https://doi.org/10.1007/978-3-319-90747-5_21

Fig. 1 Location of the Ascunsă Cave in the karst of Mehedinţi Mountains

Cave Description

The cave has two entrances, one in the form of a portal and the second one a pothole. After a series of tight crawls, the main passage opens up in the White Chamber (−25 m) and continues to have large dimensions for most of the explored parts of the cave. Passages developed entirely in limestone near the entrance and in the back of the cave are the tightest. The cave is at the moment 691.5 m and is 185 m deep (Fig. 2).

The cave morphology is relatively simple, a main gallery with only one short side passage, named The Tributary Passage. Because the wildflysch walls could not support massive limestone formations or were undermined by fluvial erosion, large collapsed blocks occupy most of the main passage. Calcite deposition cemented some of these blocks, generating new passages that run in between (Fig. 3).

Being a stream cave, there are a few fluvial sediment accumulations, mostly fine sand and silt, but only in restricted areas. The largest part of the sediments resulted through the collapse of the wildflysch walls, of the limestone ceiling, or even massive speleothems. A very large rock debris accumulation is located in the Mushrooms' Chamber (Sala Ciupercilor; −55 m), and it appears to have moved down through a small diameter chimney, now impenetrable. All along the cave, there are numerous speleothems, mostly stalactites, stalagmites, and flowstones, but other forms such as shields are also present.

Speleogenesis

The shaft entrance is probably a former sinking point (ponor) of Mohilii Valley, which was abandoned after the stream eroded into the subsurface and used the portal as its new

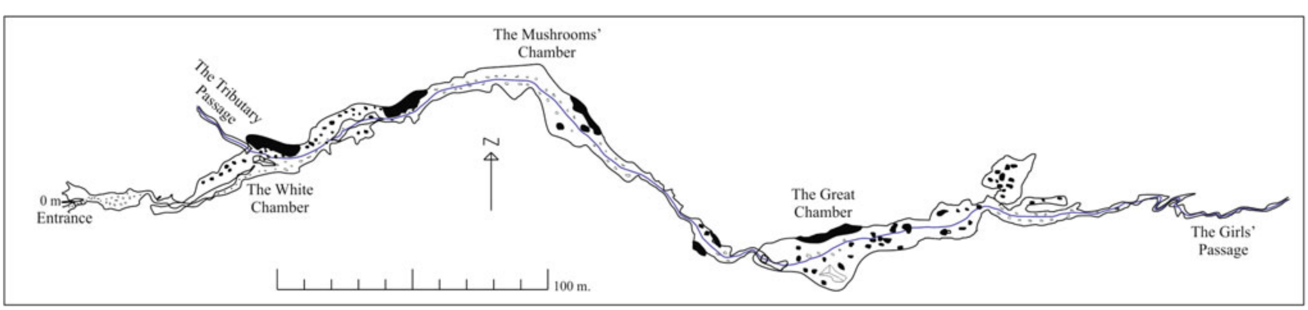

Fig. 2 Map of the Ascunsă Cave

Fig. 3 The Great Chamber. Please note the caver on the right (photograph courtesy of AP Iordache)

entrance/ponor. The presence of slickensides and ceiling anastomoses is showing that the initial development of the cave was along bedding planes. U–Th dating work (Drăguşin 2013; Drăguşin et al. 2014; J. Hellstrom pers. comm.) identified stalagmites with various ages, spanning the period since ~119,000 years ago until present. From field observations, much older speleothems are present, implying an even older age of the cave.

Cave Climatology

Ascunsă Cave is included in a monitoring program by the "Emil Racoviţă" Institute of Speleology (Drăguşin et al. 2017). The study aims to clarify the relationship between the underground climate and that from the outside, and the way in which climate signals are transferred from the surface into the underground via physical and chemical parameters of drip waters (isotopic composition, geochemistry, etc.). The mean cave temperature between February and August 2015 close to the White Chamber (−30 m) was 7.0 °C, whereas in the Great Chamber (Sala Mare; −112 m) it reaches 7.3 °C, reflecting the increase in values with depth.

For the period 2012–2015, CO_2 concentration in cave air varied between seasons, with the lowest levels recorded during March–May and the highest in November–January. These values do not rise above 3500 ppm although CO_2 concentrations around 9000–10,000 ppm were measured in drip water. This suggests that the cave is continuously ventilated, with an intensity that differs with the seasons. During the February–November 2015 period, when also drip water CO_2 levels were measured, these were higher in the White Chamber than in the Great Chamber (~9000 and ~7000 ppm, respectively). Nevertheless, due to stronger ventilation, air CO_2 concentration was almost equal at the two sites (~2200 ppm).

Cave Biology

During the cold season, a bat colony composed of several hundred individuals of four species: *Myotis myotis, M. emarginatus, Rhinolophus ferrumequinum,* and *R. hipposideros* congregate in the cave. Moreover, *Salamandra salamandra,* and species of the Coleoptera, Diptera, and Lepidoptera orders were observed inside the cave. Even in the deepest parts of the cave, at 100 m below the surface, rodents are active throughout the year.

Acknowledgements This work was financially supported by the FREem project (IFA-CEA C4-08/2014). It is also part of the research program of the "Emil Racoviţă" Institute of Speleology (Romanian Academy). We thank the administration of the Mehedinţi Plateau Geopark and all our friends and colleagues for their support during the exploration and research activities at the cave.

References

Codarcea A, Răileanu G, Năstăseanu S, Bercia I, Bercia E, Bişioanu C (1964) Geological map of Romania, scale 1:200000, L-34-XXIX, Baia de Aramă sheet, Institutul Geologic, Bucureşti

Drăguşin V (2013) Late Pleistocene climate variability recorded in stalagmites from Romania. Unpublished Ph.D. Thesis, Babeş-Bolyai University, Cluj-Napoca

Drăguşin V, Staubwasser M, Hoffmann DL, Onac BP, Ersek V, Vereş D (2014) Constraining Holocene hydrological changes in the Carpathian-Balkan region using speleothem $\delta^{18}O$ and pollen-based temperature reconstructions. Clim Past 10(4):1363–1380

Drăguşin V, Balan S, Blamart D, Forray FL, Marin C, Mirea I, Nagavciuc V, Orăşeanu I, Perşoiu A, Tîrlă L, Tudorache A, Vlaicu M (2017) Transfer of environmental signals from the surface to the underground at Ascunsă Cave, Romania. Hydrol Earth Syst Sci 21:5357–5373

Goran C (1981) Catalogul sistematic al peşterilor din România. Ed CNEFS, Bucureşti, p 456

Povară I (2012) Valea Cernei: morfologie, hidrologie, ape termominerale. Ed AGIR, Bucureşti