

The Anniversary Celebrates the People of the Society: Emil Racoviță and Marcian Bleahu

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Abstract

This paper highlights the monumental contributions of Emil Racoviță and Marcian Bleahu to Romanian speleology, marking milestones such as the anniversary of the Romanian Geographical Society. It traces the development of biospeleology and physical speleology from early campaigns in the Apuseni Mountains to the foundation of the world's first speleological institute. Additionally, the text reviews recent advancements by the Romanian Federation of Speleology, including the 2020 Karst Map, LiDAR scanning, and 3D cave visualisation projects. Exceptional natural landmarks are discussed, including the record depth of Grind Shaft and the length of Wind Cave, the unique ecosystem of Movile Cave, the unique beauty of Piatra Altarului Cave, and the oldest evidence of prehistoric art in Coliboaia Cave. Over 10,000 new caves have been discovered since 1976, with the establishment of the Central Commission for Sport Speleology (CCSS), explored, documented, and registered in the National Cadastre of Caves in Romania, maintained by the "Emil Racoviță" Institute of Speleology (ISER), leading to a current total of over 12,600 caves inventoried by ISER. Through these examples, the work demonstrates the interdisciplinary character of modern exploration. In conclusion, this highlights the importance of protecting and preserving underground heritage.

Keywords: speleology, Emil Racoviță, Marcian Bleahu, karst morphology, cave exploration, underground heritage

Introduction

Having Emil Racoviță (15 November 1868, Iași – 19 November 1947, Cluj) and Marcian Bleahu (14 March 1924, Brașov – 30 July 2019, Bucharest) as founding figures and mentors, and on the occasion of the 150th Anniversary of the Romanian Geographical Society ([Romanian Geographical Society, n.d.](#)), the Romanian Federation of Speleology (RFS) ([Romanian Federation of Speleology, n.d.](#)), which recently celebrated its 50th anniversary, extends its gratitude, congratulations, and best wishes for future



Figure 1. Emil Racoviță (15 November 1868, Iași –19 November 1947, Cluj) and Marcian Bleahu (14 March 1924, Brașov –30 July 2019, Bucharest)

achievements on behalf of Romania's organized and nationally recognized cave exploration community.

Emil Racoviță (Fig. 1, left) was a distinguished scientist, explorer, speleologist, and biologist. He is internationally acknowledged as the founder of biospeleology, the scientific discipline devoted to the study of subterranean fauna inhabiting caves, groundwater aquifers, and other underground environments (Tabacaru & Danielopol, 2020).

Racoviță was among the foremost promoters of natural sciences in Romania and became the first Romanian scientist to participate in a scientific expedition to Antarctica, as a member of the renowned Belgian Antarctic Expedition (1897–1899) (Fig. 2).

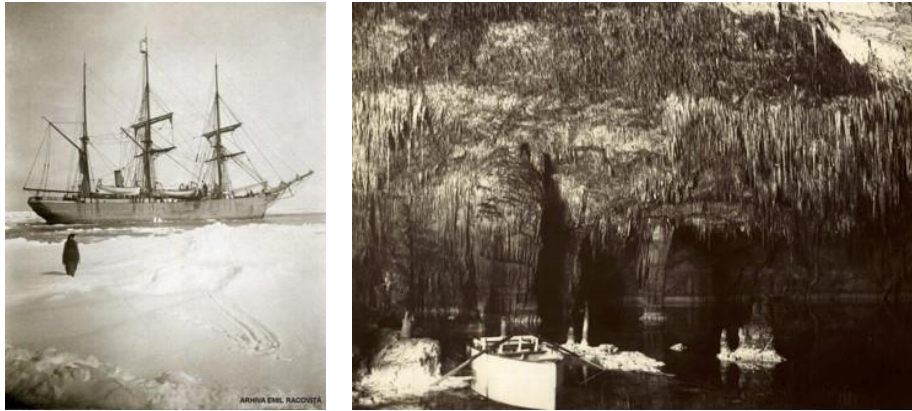


Figure 2. Belgian Antarctic Expedition (left); Cueva del Drach (right)

A bust of Emil Racoviță stands on the island of Mallorca, in the western Mediterranean. During a visit to Cueva del Drach in 1904 (Fig. 2), he discovered a small crustacean species adapted to the unique



Figure 3. The first speleology institute in the world

ecological conditions of subterranean habitats, a finding that contributed significantly to the emergence of biospeleological research.

Marcian Bleahu (14 March 1924, Brașov – 30 July 2019, Bucharest) was a geographer, geologist, speleologist (Fig. 2 (right)), mountaineer, explorer, author, university professor, politician, Minister of the Environment, and Senator of Romania (Onac, 2019).

He is widely regarded as one of the founders of physical speleology, particularly through his contributions to karst geomorphology and speleogenesis, while also serving as a mentor to generations of Romanian cave explorers.

The Apuseni Mountains (Fig. 4-left) provided a scientific link between these two outstanding scholars. Where Racoviță initiated his biospeleological campaigns during the summer of 1921, studying among other sites the Scărișoara Ice Cave (Fig. 4-right), home to one of the world's largest underground ice bodies and an important paleoclimatic archive exceeding 120,000 cubic metres of ice, Marcian Bleahu later continued this scientific tradition.

Together with researchers from the “Emil Racoviță” Institute of Speleology (ISER), Bleahu participated in numerous expeditions that led to the discovery, exploration, and surveying of several remarkable cave systems, including Cetățile Ponorului – Lost World System (Fig. 5-left), the largest karst system in Romania, featuring a doline approximately 1 km in length and 300 m deep, whose wall contains a cave entrance exceeding 70 m in height. He also contributed to the exploration of Vârtop Ice Cave (Fig. 5-right), renowned for the discovery of prehistoric human footprints dated to approximately 62,000 years ago, among many other significant karst phenomena (Onac et al., 2005).



Figure 4. Apuseni Mountains (left), Scărișoara Ice Cave (right)

His collaboration with ISER researchers and participation in extensive speleological expeditions resulted in the publication of numerous monographs and influential works dedicated to caves, karst landscapes, and subterranean environments.



Figure 5. Cetățile Ponorului (left), Vârtop Ice Cave, prehistoric human footprints (right)

Marcian Bleahu graduated from the Faculty of Sciences in 1949, specialising in Natural Sciences and Geography. In 1974, he earned a PhD in Geography from the University of Cluj with a dissertation titled "Karst Morphology – Geological and Geographical Controls of Karstification Processes" (Fig. 6).

Bleahu authored or co-authored 31 books, 40 scientific papers, and more than 400 articles addressing geology, geography, speleology, tourism, environmental sciences, history of science, history of art, music, environmental protection, civic issues, and public policy. He also produced scientific documentary scripts and delivered more than 500 public lectures, including broadcasts on radio and television.

A substantial part of his doctoral research was published under the same title and remains an authoritative reference in karst science. The volume represents a genuine treatise on karstology, supported by an extensive bibliography comprising nearly 900 references.



Figure 6. Karst Morphology (left), Global Tectonics (right)

The work provides a critical analysis of the physicochemical, lithological, tectonic, mechanical, and hydrogeological factors governing karstification processes and provides a comprehensive framework for understanding the mechanisms controlling karst development.

Bleahu was also the author of Global Tectonics (Fig. 6), published in two volumes (1983 and 1989), representing at the time one of the most comprehensive syntheses of plate tectonic theory ever produced by a single author. The work explains the formation of major geomorphological features through plate dynamics and includes applications relevant to the geology of the Romanian Carpathians (Bleahu, 1983–1989).

His lifelong conservation project was the establishment and promotion of the Apuseni Natural Park. The region's geological, geomorphological, biological, and cultural diversity, together with its exceptional karst landscapes, exerted a profound influence on Bleahu, motivating decades of scientific research.

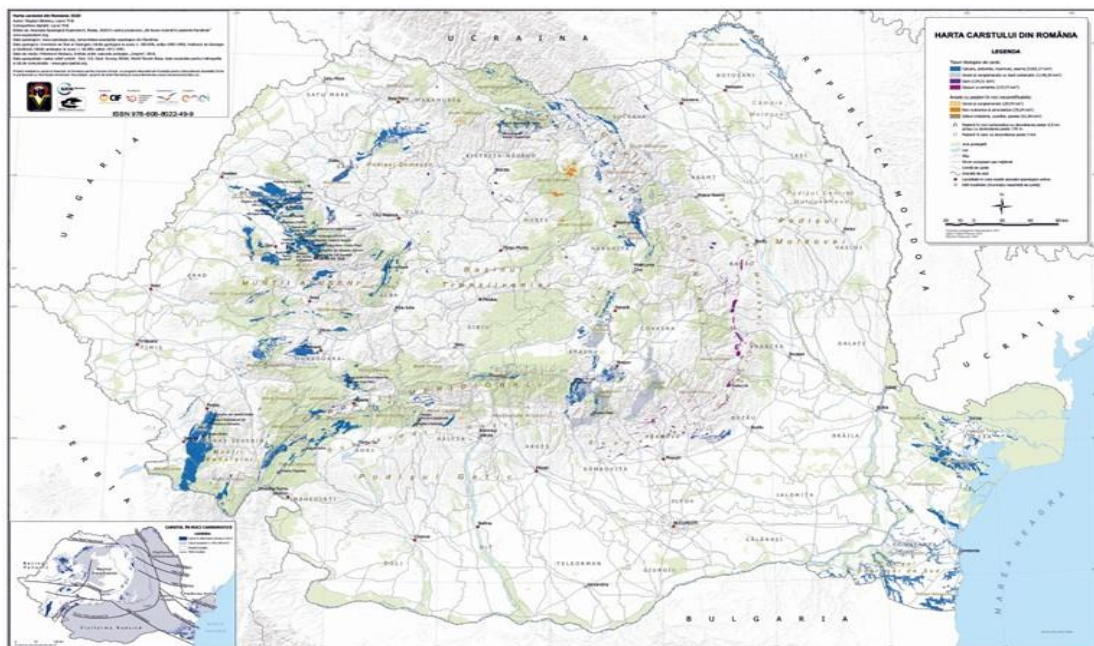


Figure 7. Karst Map of Romania (Bădescu & Tîrlă, 2020)



Figure 8. *Man and the Cave* (1978) (left), *World's longest cave developed in salt deposits* (between 1980 and 1992) (right)

Among the Romanian caves that became subjects of extensive speleological and karstological investigations are Bulba Cave, Scărișoara Ice Cave, and Buhui Cave.

In 2024, marking the centenary of Marcian Bleahu's birth, the Vrancea Branch of the Romanian Geographical Society organised a commemorative event in his honour. On this occasion, the Romanian Federation of Speleology presented recent achievements, heritage discoveries, and scientific developments of common interest.

The quality and scientific significance of the Federation's activities have been recognised through awards for cave and karst mapping projects at both national and international levels, including world titles obtained at congresses of the International Union of Speleology (UIS) in Switzerland (1997) and the United States (2009) (Bleahu et al., 2019–2023).

Recent contributions include the Karst Map of Romania (2020 Edition) (Fig. 7), developed within the project "Bringing Light into Romania's Caves", the Young Speleologist's Handbook, and innovative projects involving LiDAR cave scanning and virtual cave tours (Asociația Speologică Exploratorii, n.d.).

Through their continued efforts, Romanian speleologists demonstrate the essential role of geography and speleology in scientific knowledge, exploration, research, heritage valorisation, mountain rescue, and cave rescue activities.

Modern cave exploration is an interdisciplinary endeavour that integrates thematic cartography, identification of karst-prone terrains, groundwater tracing techniques, Geographic Information Systems (GIS), spatial modelling, and 3D visualisation within a geomorphological context.

Several major exploratory projects remain ongoing, including investigations in Vărășoia Cave, Șura Mare Cave, Cernișoara Cave, Grind Shaft, and karst systems located in the Vrancea Subcarpathians.

A notable recent achievement is the Paul Matoș Hall within the Vărășoia Cave, with an estimated volume of approximately 1.5 million cubic meters¹. While Vântului Cave currently exceeds 50 km in surveyed passages and remains Romania's longest cave (Romanian Federation of Speleology, 2015), ongoing exploration suggests the potential discovery of even larger cave systems.

¹ The Humpleu system, with a development of over 41 km and a total elevation difference of 320m, has 4 of the largest halls in Romania: 1. Giants' Hall (750/111/35 m), 2.8 million cubic meters, the second largest in Europe; 2. Gabor Hallasi Hall (490/103/35 m) 1.3 million cubic meters; 3. Dance Hall (304/77/55 m) 0.48 million cubic meters; 4. Dan Coman Hall (242/73/23 m) 0.41 million cubic meters (Romanian Federation of Speleology, 2001).



Figure 9. Movile Cave - siphon sulfurous water (team Sarbu Serban): upper gallery, *Lepthyphantes constantinescui*, *Cryptos speleorex*, *Trachelipus*

Grind Shaft, located beneath Grind Peak in the Piatra Craiului Ridge, currently holds Romania's national depth record. Following more than 34 years of exploration, a vertical extent of –815 m was reached in 2025 ([Institutul de Speologie „Emil Racoviță”, n.d.](#)). The system has been documented through integrated topographic representations, including terrain models, vertical profiles, and altimetric analyses.

Once again, cave exploration continues to reveal exceptional scientific and natural values hidden within previously unknown geographic spaces.

Such knowledge should be disseminated not only among specialists but also to the wider public, enabling society to benefit from the scientific, educational, and cultural significance of speleological discoveries.

Among Marcian Bleahu's most influential publications are: *Conquerors of Darkness* (1976), *Man and the Cave* (1978), (Fig. 8), *Karst Landforms* (1982), *Protected Areas and Nature Conservation* (2019)

While celebrating discoveries, we should also remember several landmark achievements of Romanian speleology that remain relatively unknown to the public.

According to the Bulletin of the International Union of Speleology (UIS):

“In Eastern European countries possessing extensive rock-salt and potash deposits, large-scale speleootherapy centres have been established.”

Romania occupies a unique position globally through the exceptional diversity of lithologies hosting caves, a fact that remains largely unknown outside the speleological community.

The Emil Racoviță Speleological Club of Bucharest achieved a world record through the discovery and exploration of the 6S Cave at Mânzălești, located on the Meledic Plateau in the Vrancea Subcarpathians. Between 1980 and 1992, it was recognised as the world's longest cave developed in salt deposits (Fig. 8), a status officially acknowledged during the 10th UIS Congress in Budapest (1989) (Marunteanu & Ioane, 2010).

Movile Cave (Fig. 9), discovered in Southern Dobrogea in 1986, is considered one of the most significant caves worldwide². Its scientific importance stems from a unique ecosystem sustained by sulfur-based chemosynthesis, attracting international attention, including that of NASA researchers.

The ecosystem is believed to have remained isolated from the surface environment for approximately 5.5 million years, representing one of the most extraordinary natural laboratories for the study of life in extreme environments. Life in the cave is represented primarily by microbial mats (bacteria) on the cave walls and the surface of pools, based on chemosynthesis (Sarbu et al., 1996).



Figure 10. “Calcite water lily” Altar Stone (photo Daniel Cârlugea)

² 27th International Conference on Subterranean Biology. (2026). ICSB 2026. <https://icsb2026.com/>

Piatra Altarului Cave (Fig. 10), discovered in 1984 in the Bihor Mountains ([Societatea Română de Speologie, n.d.](#)), was closed shortly after its discovery due to its outstanding scientific and aesthetic value. Over 90% of all calcite cave formations described in the literature are found here. Its exceptional remarkable abundance and diversity of speleothems within a relatively small area have earned it international recognition among cave scientists.

Coliboaia Cave (Fig. 11), located in the Apuseni Mountains, contains prehistoric parietal art attributed



Figure 11. Coliboaia Cave, woolly rhinoceros, ca. 34,000-36,000 years B.C. (photo Posmoșanu Andrei)

to the Aurignacian or Gravettian cultural horizons and dated between approximately 32,000 and 36,000 years before present ([Muzeul Țării Crișurilor. Crisia, XLI, 2011](#)).

Together with the paintings of Chauvet Cave in France, the Coliboaia artworks represent some of the earliest known artistic manifestations of modern humans in Europe ([Clottes et al., 2013](#)).

The depiction of a woolly rhinoceros, estimated at between 23 000 and 35 000 BP (Gravettian or Aurignacian), is among the most remarkable examples of Paleolithic cave art discovered in Romania ([UNESCO World Heritage Centre, 2024](#)).

The exploration of Romania's karst regions continues to reveal invaluable scientific information and cultural heritage. This ongoing endeavour is driven by dedicated researchers and explorers who demonstrate professionalism, ethical conduct, scientific rigour, and courage, making significant contributions to both Romanian and international geography, speleology, and Earth sciences.

Competing interests

The authors declare that they have no competing interests.

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