

Cave sediments and fossils as karst archives: the Urşilor and Muierilor caves, Romania

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During the last eight years an ongoing interdisciplinary research is being carried out at the Urşilor and Muierilor caves, Romania. This sedimentological, geomorphological and geochronological study aims at better understanding of the taphonomy of the MIS 3 fossil accumulations and their palaeoclimate context. The two sites contain complex types of fossil thanatocoenosis - in situ, secondary or mixt.

Numerous methods of investigation, typical for this type of multidisciplinary research were applied: AMS 14C direct dating on fossil bone (N = 42), U/Th dating of the relevant speleothems (N = 4), termoluminescence for dating sediments (OSL; N=7), analysis of physical and chemical properties of cave sediments, rock magnetism, stable isotope analyses on the cave bear's bone collagen ($\delta^{15}\text{N}$ and $\delta^{13}\text{C}$; N=125), taphonomic methods for assessing the bone assemblage's properties (MNI, NISP, ISD, long bone orientation etc.), high resolution osteometry, laser scanning of the cave bear' bioglyphs etc.

In Urşilor Cave, the obtained results on direct dating pointed to a continuous population by the cave bear fauna between ~45 and ~29 ka cal BP. The cave bear assemblage from the Excavation Chamber represents an in situ thanatocoenosis with high density of individuals (MNI = 109 individuals/9 m²), deposited between ca. 45 to 39.2 ky cal BP. Based on combined dating of speleothems and cave sediments, it appears that speleothem precipitation was not prevented during cold periods and sediment depositional events were more likely linked to warmer and wetter periods. The stable isotope analyses performed on the cave bear collagen indicated omnivorous habits for the analyzed individuals, similar to the Pesteră cu Oase population. We performed a first palaeoichnological assessment of the site, with several bioglyphs being indirectly dated based on their assignment to skeletons or parts of cave bear skeleton.

In Muierilor Cave, the preliminary data show that the cave bear fauna dates back between ca. 48-28 ka cal BP, roughly coeval with Urşilor Cave. Long bones orientation was analyzed over ca. 9 m² and indicates reworking processes of the fossil bones (secondary thanatocoenosis). The reworking appears to be linked to a climate event that generated successive floodings of cave passages by ~35 ka.

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