

FROM HUNTER-GATHERERS TO HERDERS AT ZEMUNICA: CHANGING CAVE ENVIRONMENT AND SITE USE

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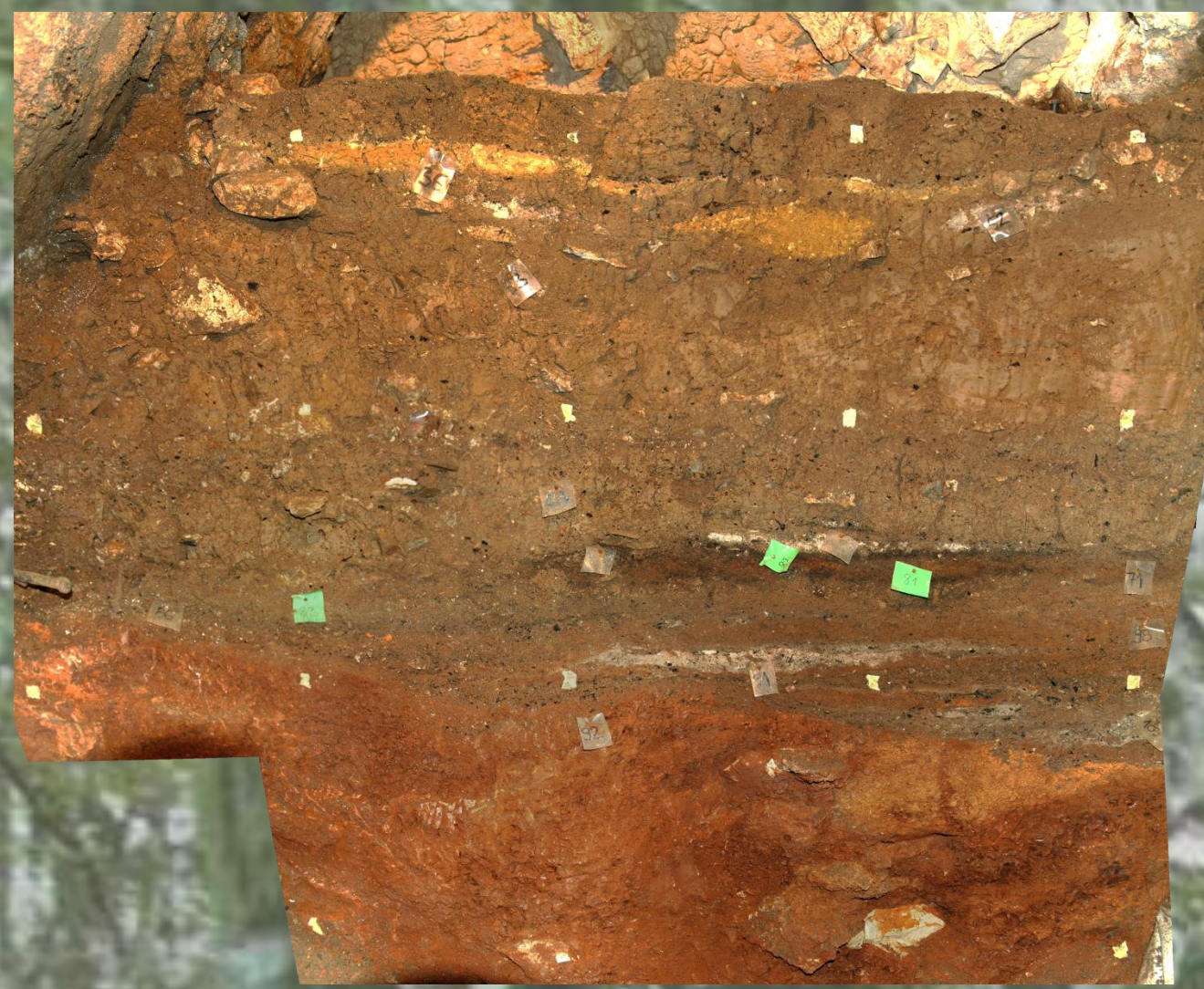


Fig. 1. a) Profile of the Trench 3a.



b) Profile of the Trench 3b.

INTRODUCTION

Zemunica Cave is situated in the karst area, 35 km from Split, Croatia. The rescue excavations of the cave (on the route Dugopolje-Bisko of the Adriatic motorway) directed by I. Karavanić (University of Zagreb), were carried out in 2005. The cave is a 16 x 18 m wide single-chamber, with a maximum height of about 4 m, and there is a natural opening in the middle of its ceiling. The entrance to the cave is situated at the base of a cliff facing northwards. The cave sequence ranges from the Late Upper Palaeolithic to the Early Bronze Age. Geoarchaeological studies based on sedimentology and soil micromorphology were carried out on sediments from Trench 2 and 3, indicating strong postdepositional processes; different use of the cave by humans was also confirmed.

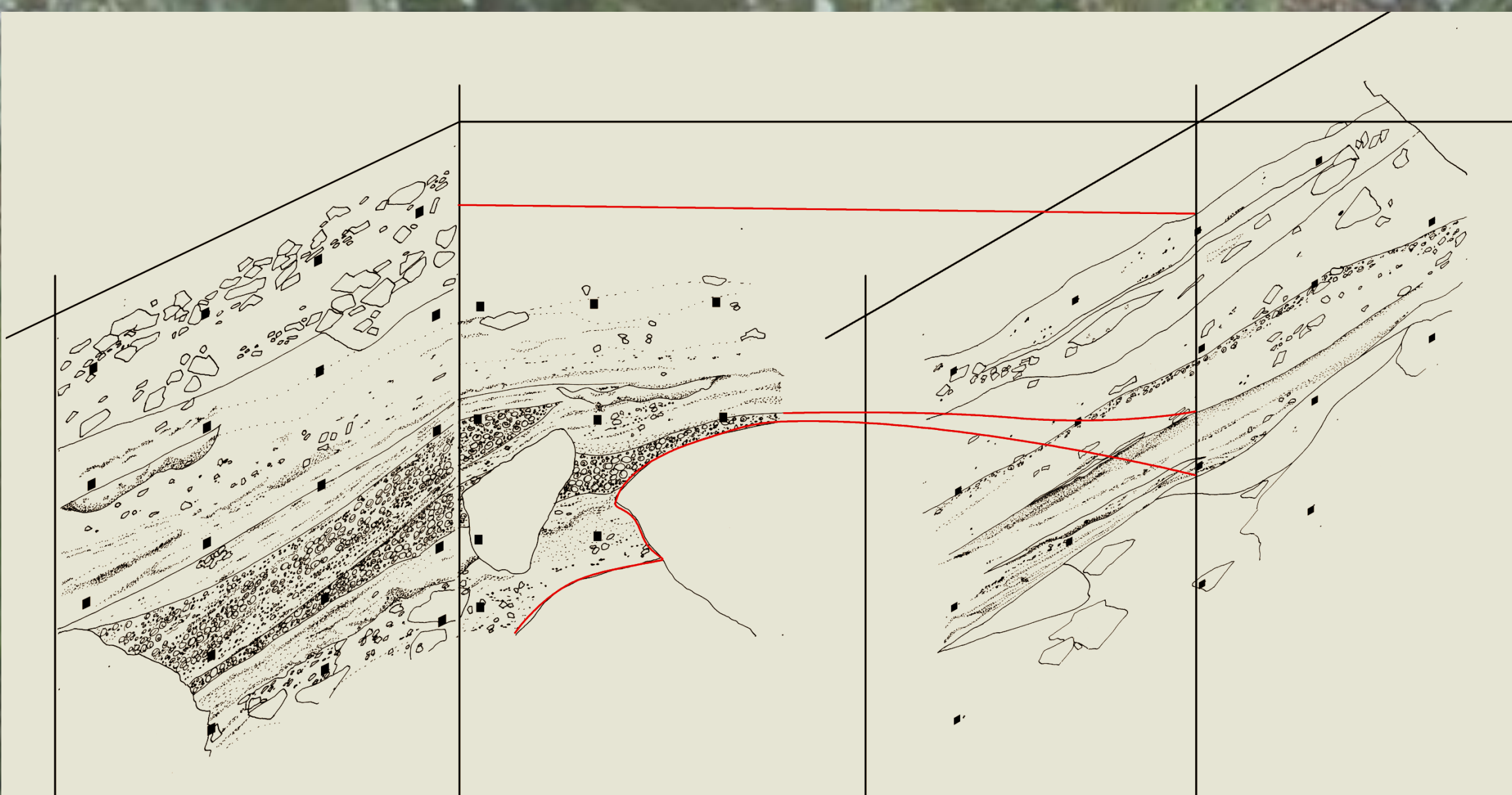


Fig 2. Correlation of the profiles shown in Figure 1.

RESULTS

Early Bronze Age to Neolithic layers

Almost all of the post-Mesolithic layers are coprogenic and include herbivore dung (sheep/goat/ possibly cattle). In trench 3a the first indicator of stabling is an *in situ* burnt stable layer (SU 64-82-81); it includes a group of grayish ash accumulations with burnt droppings and phytoliths, overlying a dark brown layer of burnt droppings rich in fine organic matter, and a rubefied layer with frequent articulated phytoliths which indicate the presence of a litter. This unit resembles the Neolithic burnt stable layer 116 in trench 3b. The other Neolithic (SU 53, 115B, 114, 45) to Bronze Age (SU 40, 43) layers are brown to grayish brown and homogeneous, with spherulites and phytoliths dispersed in the groundmass. An accumulation of incompletely burnt or unburnt herbivore dung is a possible explanation for the difference between the "classical fumier" and these layers. The top of the sequence of trench 3 includes yellowish silty clay; at microscopic scale it is made up of an almost pure sediment rich in white mica, very fine quartz, and articulated phytoliths - an intentional accumulation of selected material, a possible prepared surface/floor.

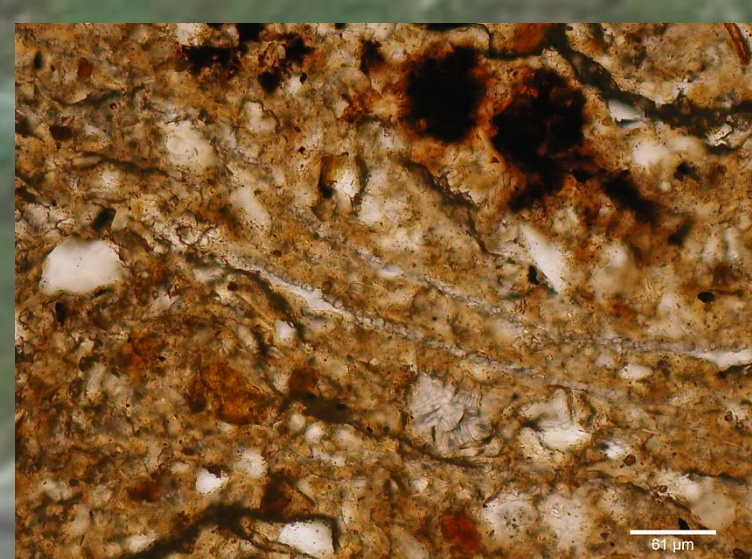


Fig. 3. Bronze Age floor preparation surface, PPL

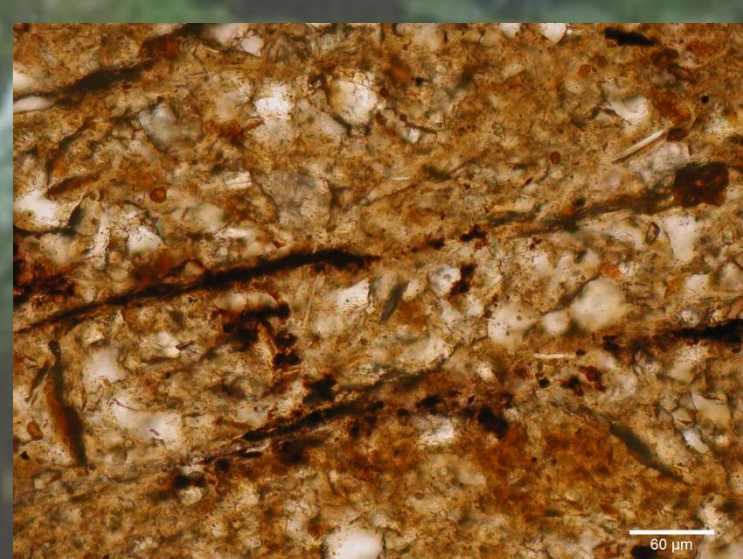


Fig. 4. Bronze Age floor preparation surface, PPL

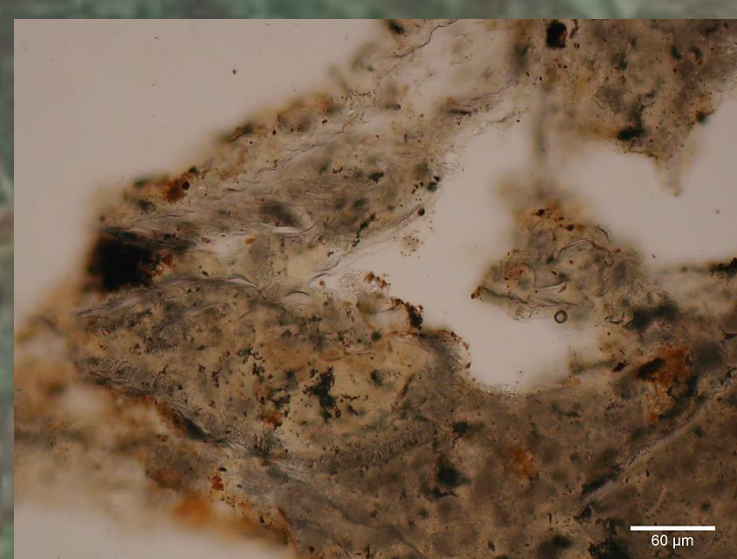


Fig. 5. Neolithic straw/ litter, PPL.

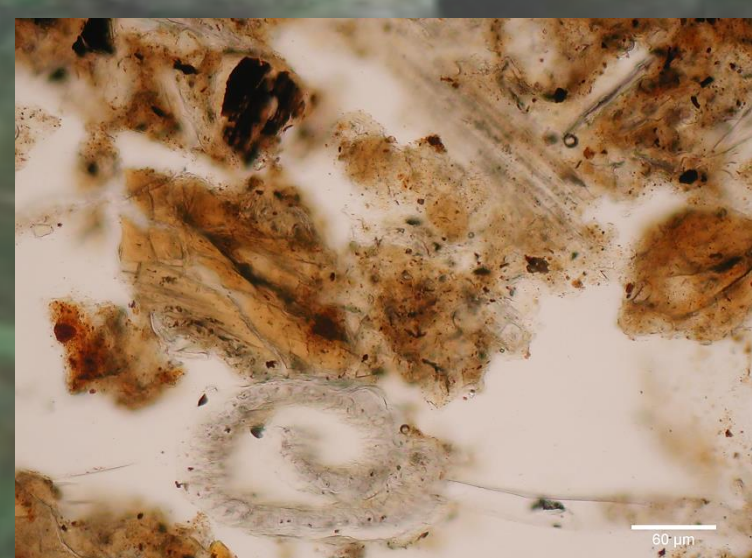


Fig. 6. Neolithic straw/ litter, PPL.

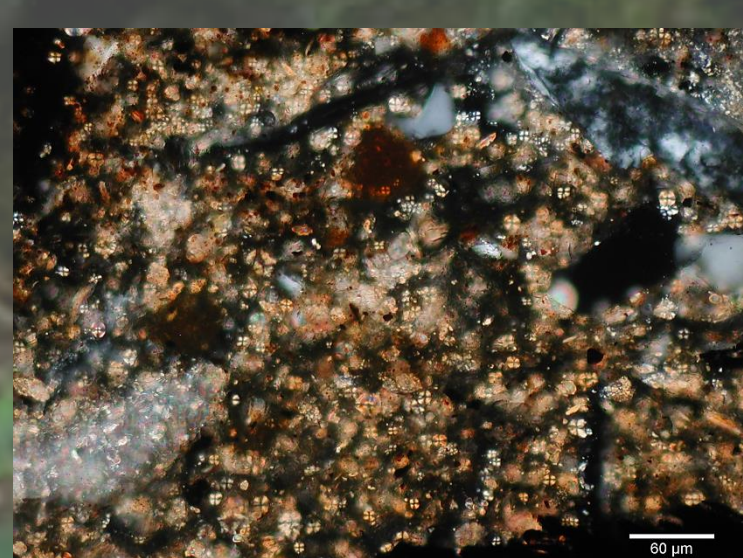


Fig. 7. Sheep/goat dung, XPL.



Fig. 8. Trampled herbivore dung, XPL.

Mesolithic layers

In trench 3b there is a sequence of two snail middens (SU 134) including reddish sediments resembling the bottom Pleistocene unit, but with some evidence of fine layering or lamination; within each of the shell accumulation levels, the quantity of reddish sediment -which is dominant at the base of the level- decreases upwards. Aggregates of reddish sediment occur also within the middens, and can be easily identified at microscopic scale as pedorelicts deriving from the dismantling of the lowermost reddish units. Other Mesolithic units include common charcoal, ashes and bones – domestic waste deposits.

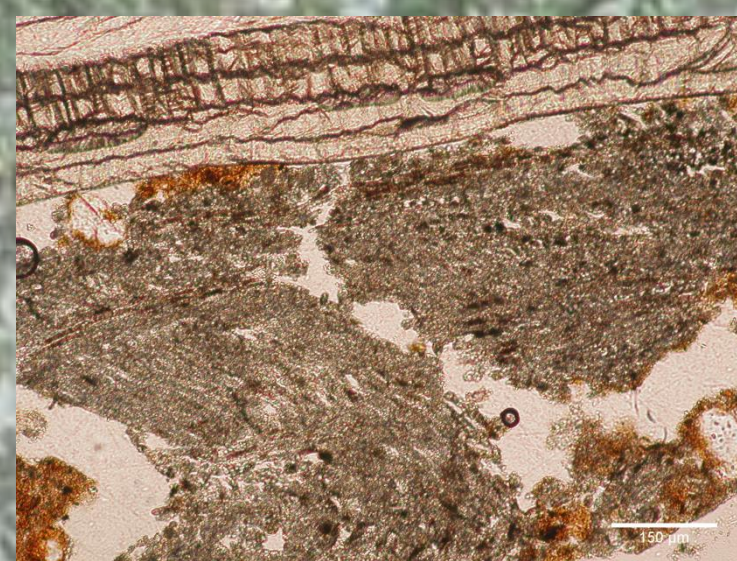


Fig. 9. Burnt plant and snail shell, PPL.

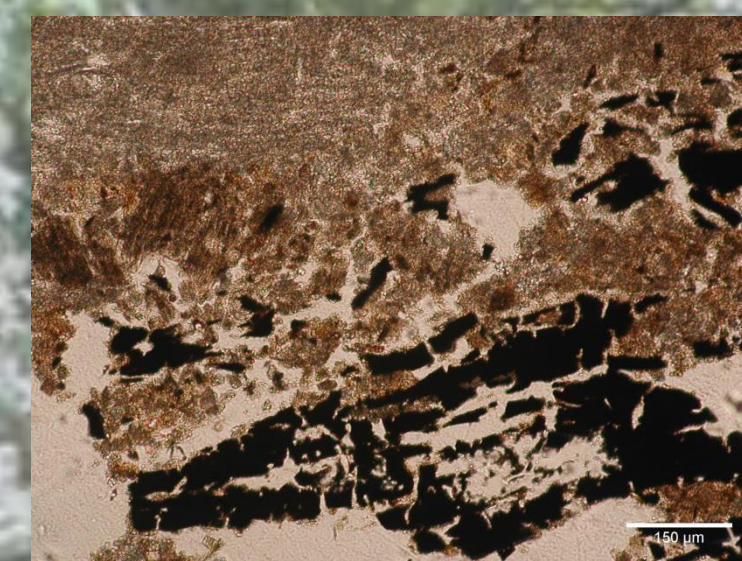


Fig. 10. Ash and charcoal, PPL.

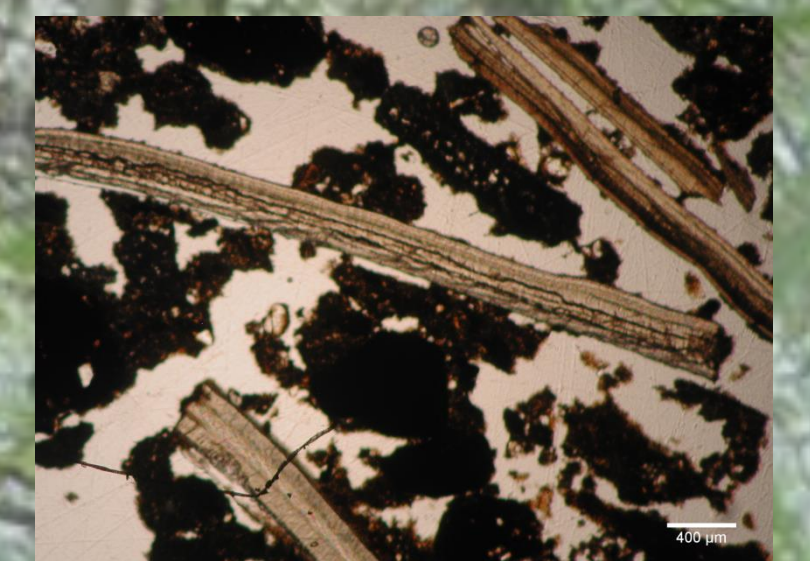


Fig. 11. Snail shells, PPL.



Fig. 12. Snail shells, XPL.

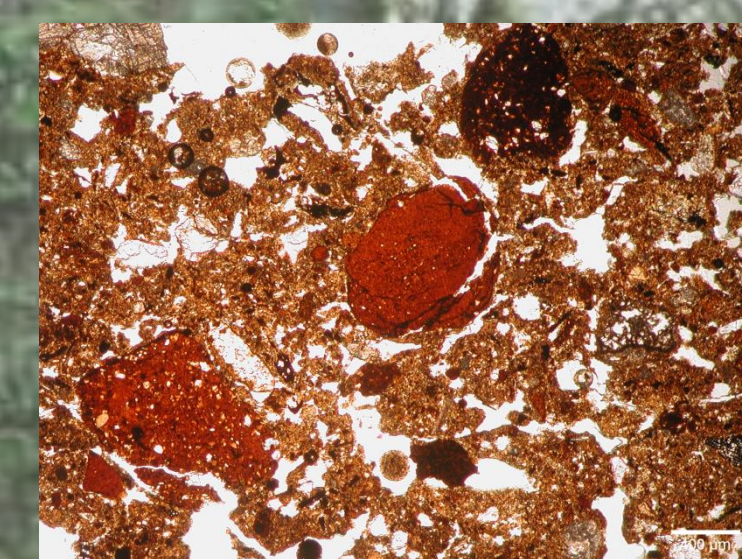


Fig. 13. Pedorelicts, PPL.

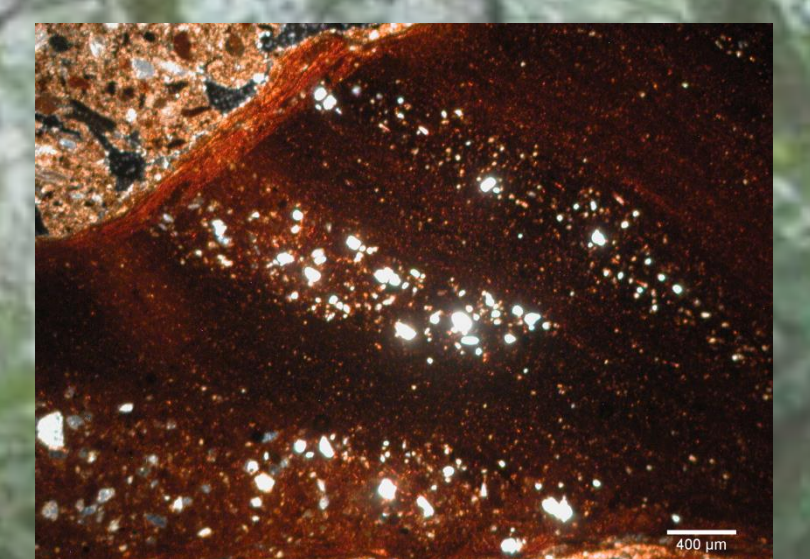


Fig. 14. Pedorelict, XPL.

Paleolithic layers

In trench 3a, the top surface of the lowest group of reddish units is clearly an erosional feature -- a strong gap -- that dips southwards, putting into contact two different sedimentary environments. The erosional processes removed the fine component of the sediment, while the large blocks were left in place, with their bottom still included in the red sediment and the top protruding into the overlying levels. At microscopic scale, in these levels ice lensing was observed, indicating deep seasonal frost. In trench 3, mostly in 3b, the sequence directly overlying the gap is made up of levels that plunge into the erosional shape and tend to fill up its depressions; SU 139 is a brownish silty loam including common charcoal, organic matter and bone, it is a domestic waste deposit. Reddish pedorelicts deriving from the underlying levels indicate some reworking.

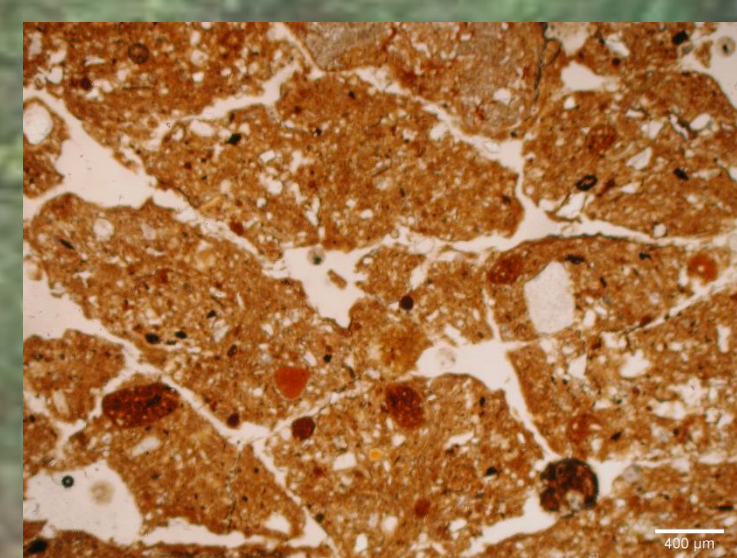


Fig. 15. Ice lensing-deep seasonal frost, PPL.

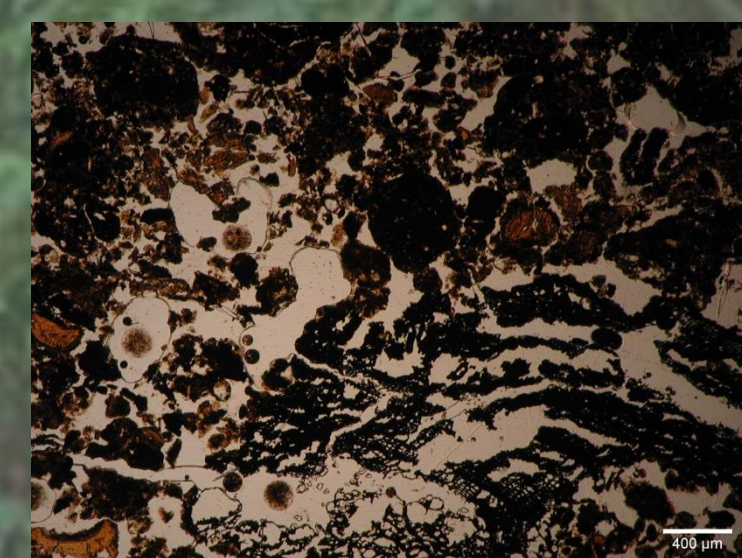


Fig. 16. Charcoal, burnt bone, PPL.

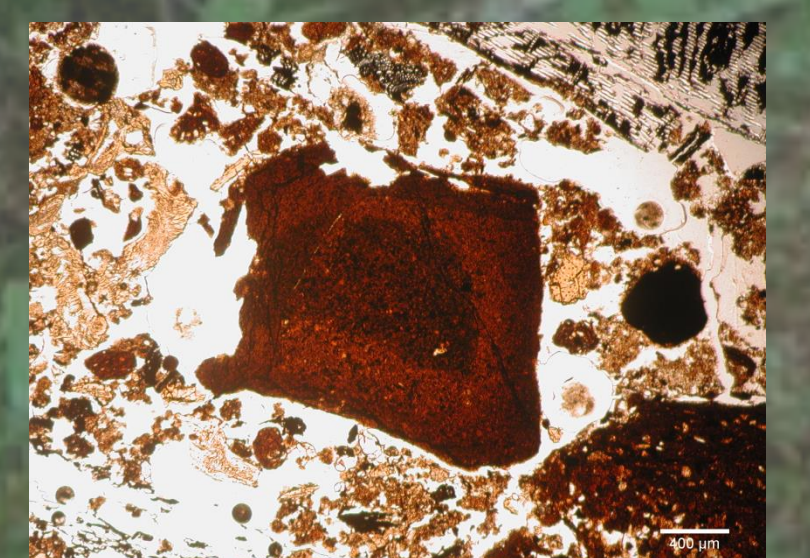


Fig. 17. Pedorelict, SU 139, PPL.

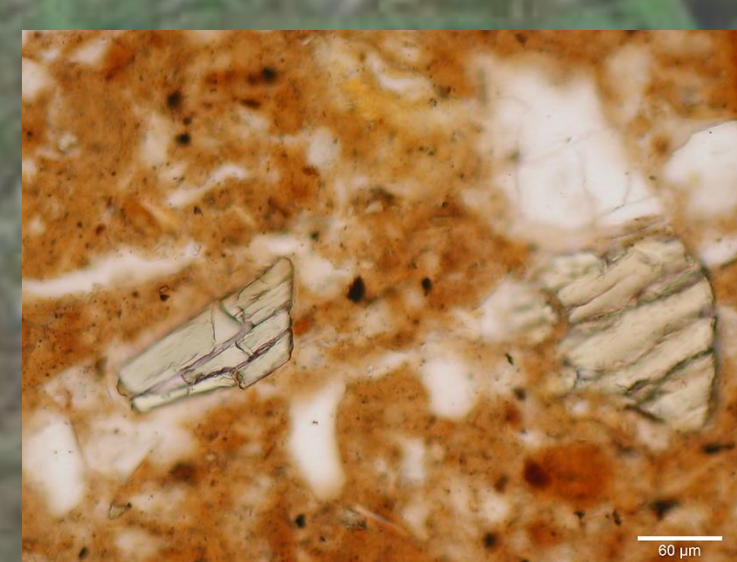


Fig. 18. Pyroxenes, PPL.

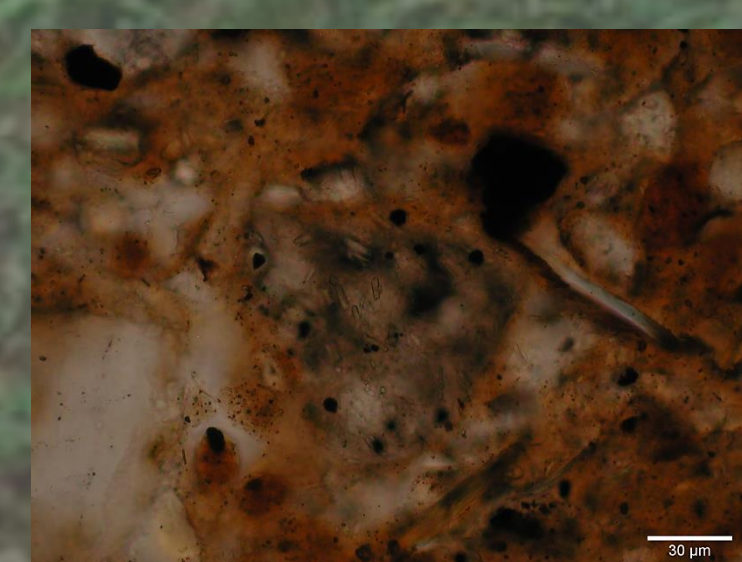


Fig. 19. Lava fragment, PPL.

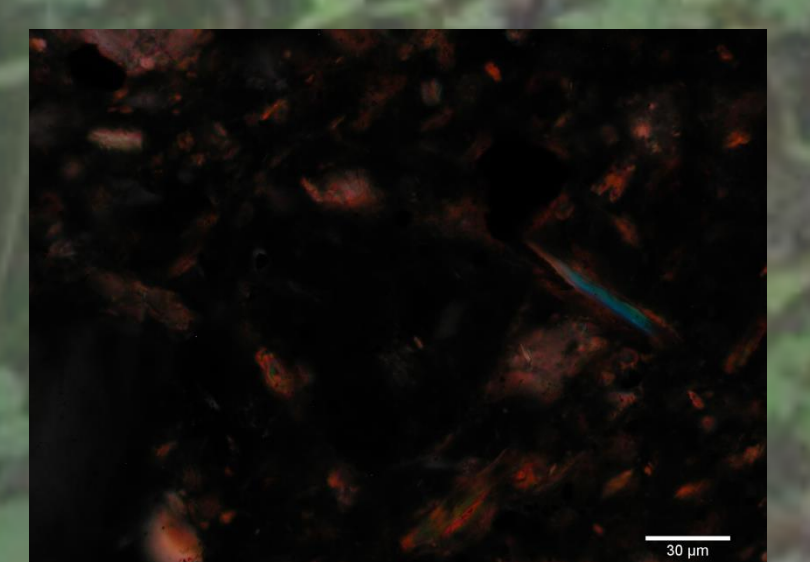


Fig. 20. Lava fragment, XPL.

CONCLUSIONS

Geoarchaeological studies indicate strong postdepositional processes (reworking and mixing due to erosional processes), and some hiatuses. Different use of the cave by humans was also confirmed. The Upper Palaeolithic levels consist of domestic waste residues. The Mesolithic levels mostly comprise domestic waste deposits, including ash, bone fragments and more or less crushed land snails. In the area of Trench 3b, the sequence of thick layers dominated by colluviated land snails and terra rossa pedorelicts probably indicates cyclical reworking of anthropic snail middens by natural erosional processes. The Neolithic, Copper, and Bronze Age part of the sequence is characterised by continuous evidence of sheep/goat and probably cattle dung accumulations. Articulated phytoliths also occur within the cave sediments, indicating the use of straw litter for these animals.

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