

# Case study 21: Caves and shepherds in Italy

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## **Introduction**

Caves and rockshelters have been widely used for stabling flocks from the Neolithic onwards throughout the Mediterranean region (Macphail *et al.*, 1997; Brochier *et al.*, 1999; Boschian & Montagnari-Kokelj, 2000; Boschian & Miracle, in print). Open-air sites and caves were integrated in complex systems of agricultural and pastoral land exploitation that played an important role in the economy of past societies. The Neolithic groups of unspecialised and partially nomadic shepherds became more and more specialised until they became transhumant pastoralists that, during the Bronze Age, moved through the territory on a regular annual base.

The pastoral use produced characteristic deposits of burned dung inside caves. In most cases, these deposits can be readily recognised in the field. Ambiguous situations can be resolved by thin section analyses, which can also differentiate several microscopic *facies* and provide deeper insights in the reconstruction of the cave use.

## **Characteristics of the deposits**

Two main deposit types can be identified at eye-scale.

### *“Layer-cake” deposits*

This type is peculiar for its distinctive black-and-white layered aspect (Figure 1). Couples of blackish and whitish layers or lenses are cyclically organised in finely interfingered stacks that can be up to several metres thick, so that the whole feature resembles a “layer cake”. The layers and lenses are thin (2-3 to 8-10cm) if compared to their extension, which may be up to several square metres. The limits are always sharp and plain or slightly undulating.

It can be inferred that black layers are always bottom elements within the couples, because isolated, one-couple lenses always have the black horizon at their bottom. The black levels are thinner than the white ones, and in some cases can also be discontinuous. Their structure is fine grained, rather loose and porous. Conversely, the whitish horizons are more compact, mottled by minor differences in texture, colour and porosity.



Figure 1: Vela Cave (Croatia). "Layer-cake" facies. (Metric band in cm).

The grain-size is sandy silt loam to sandy loam. At microscopic scale, the black levels are mainly made up of coarse vegetal remains at various degrees of charring; cell and tissue structures of the original plant organs are well preserved, *i.e.* mostly of leaves, twigs and young wood.

Brownish aggregates of partially burned fibrous coprolites, up to about 1-2cm in size, are also present, but occur much more frequently in the whitish levels. The fibres are made up of connected opal phytoliths and of partially charred to completely ashed organic matter, 5-20µm thick and up to 1-2mm long. Their size and spatial organisation is linked to the shape of the aggregates: short fibres are randomly compressed within subspherical (sheep/goat) coprolites (Figure 2), while the longer ones occur in wavy bundles within elongated droppings that can be attributed to cattle or possibly to goats. Spherulites (Canti, 1997; 1998) and ash (Canti, 2003) are present, even if rather rare. The latter occurs as very fine carbonate material, and sometimes as micrite aggregates pseudomorphic on oxalate crystals.

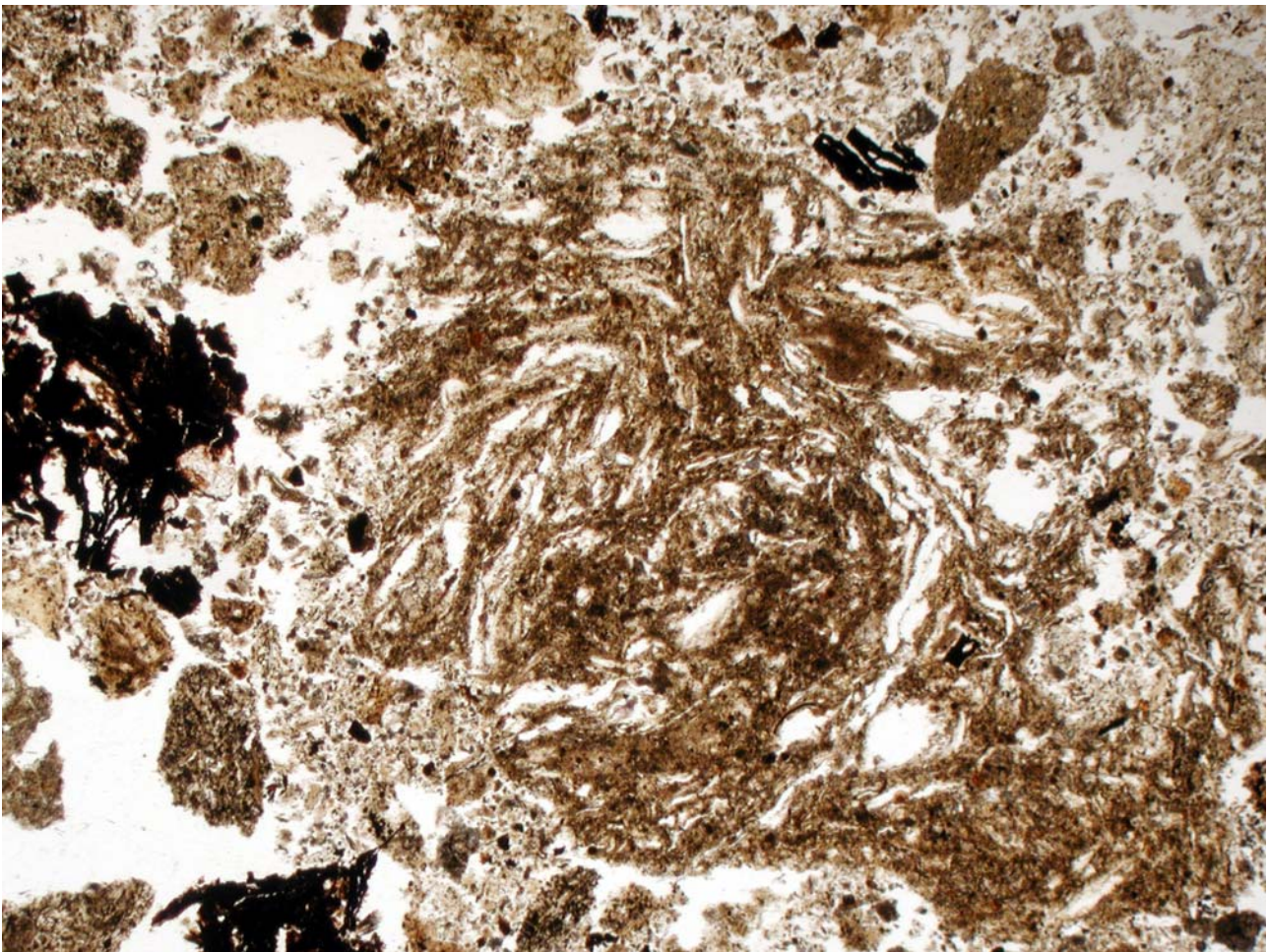
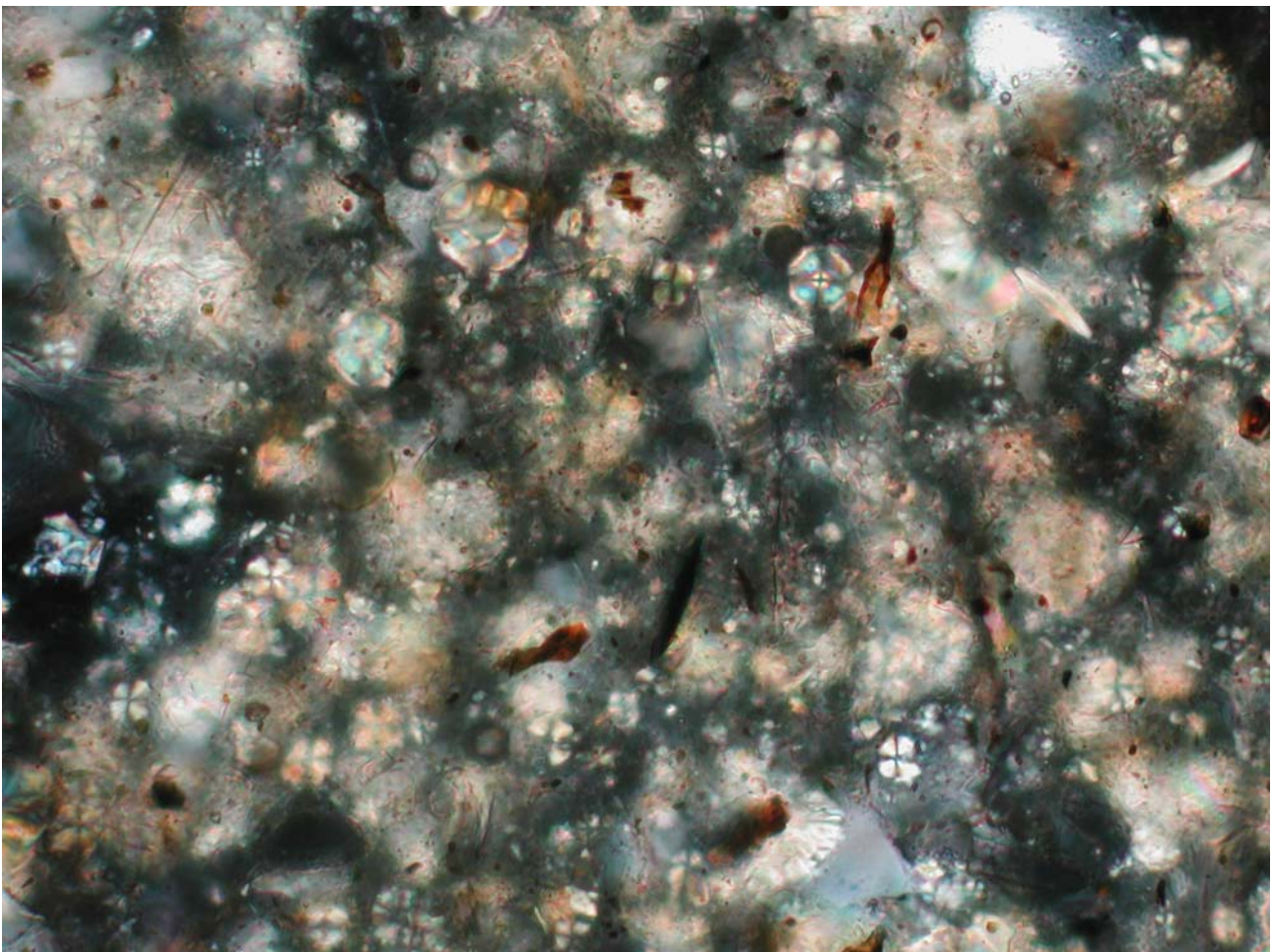


Figure 2: Pupičina Cave (Croatia), context 20/21, layer-cake *facies*. Sheep/goat coprolite, with random internal structure. 2.5x, PPL. Frame width about 2200 µm.

*“Homogeneous” deposits*

Homogeneous brown colour and massive structure are the most evident characteristics of these deposits at eye-scale. The matrix is silty clay loam, embedding variable quantities of unsorted angular limestone gravel. The lithological units are roughly tabular, a few centimetres to 1.5m thick, bounded by sharp to clear, plain or slightly undulating limits. Isolated couples of black-and-white layers may sometimes occur. These characteristics are not particularly diagnostic of stable deposits, but the micromorphological study can highlight some relevant and distinctive aspects.

The bulk of the sediment is made up of unconnected phytoliths and faecal spherulites; randomly arranged, and never organised in higher level features. These components usually occur in the same percentage and only in some cases the spherulites prevail over the phytoliths (Figure 3).



**Figure 3: Pupičina Cave (Croatia), context 315, homogeneous facies. Dense packing of spherulites and large phytoliths. 40x, XPL. Frame width about 140 µm.**

The amorphous organic matter is very common, occurring mostly in fine silt-size chips and larger fragments that in some cases still preserve remains of vegetal cell structures. Charcoal often occurs,

usually in fine fragments. Ash is present in variable quantity, mostly as micrite aggregates pseudomorphic on oxalate crystals and as very fine carbonate material. The microstructure is massive also at microscopic scale, with small vughs or sometimes channels and chambers.

### **Interpretation**

The evidence provided by these deposits can be interpreted at various levels, depending on the data available (breadth of the excavation area, available cultural remains, etc.) and the study methods.

#### *Basic*

- The occurrence of charcoal, plant ashes, and ashed coprolites within the “layer-cake” deposits suggests that the caves were used for stabling ruminants (mostly sheep/goat, but also cattle).
- The droppings of the animals were burned periodically, probably to reduce their volume and for some sort of disinfection. This aspect is particularly relevant as these deposits were interpreted in a different way during the 1960-70s in Italy. Rather thick layers of white silt had been found in several caves at the Neolithic/Copper Age boundary, and it had been pointed out that they were (almost) completely sterile. As a consequence, the silt was interpreted as the product of cave ceiling/wall decalcification due to continental climate, when caves were completely abandoned by the Late Neolithic and Early Copper Age people who were presumed to dwell in open air sites in the lowlands.

#### *Intermediate*

- Each black/white couple within the “layer-cake” deposits represents one burning event. The lower part of the dung layer burned in oxygen-poor atmosphere (covered, more or less wet), so that plant remains and coprolites were charred; conversely, the upper part burned in oxygen -rich environment, and was ashed more or less completely.
- The charred vegetal remains within the black horizons may be interpreted as litter for animals, or possibly also as leaf and twig hay.
- Each couple may represent one phase of cave use.
- The “homogeneous” deposits may be (partially?) unburned and trampled/reworked dung deposits. The pastoral origin of these deposits is not evident at eye-scale observation; thin section (or even dust mounts on microscope slides) studies let infer their origin, as phytoliths and faecal spherulites can easily be detected.
- The rhythmic aspect of the “layer-cake” sequences suggests that the frequentation of the caves was cyclical, like in transhumance.

- Two cave-use models were proposed, basically depending on the quantity of cultural remains found in the stable deposits: 1) *grotte-bergérie* (stable cave) if few cultural remains are embedded in the deposits, or 2) *habitat bergérie* (cave used for home by humans and stable for animals) when the remains are abundant (J.-É. Brochier, 1991, 2002). Studies on the distribution of the remains and of the deposits may give hints about the organisation of space (*e.g.* domestic *versus* penning) within the caves, and on their use.

### *Advanced*

Subtle differences between pastoral deposits can be observed at eye- and microscopic scale, so that various *facies* can be formalised. Some of these are often connected to peculiar cultural phases, originating a sort of sequence stratigraphy that may be interpreted in terms of land exploitation change through time. The following sequence can be identified in various caves of the Italian region.

- 1) Brownish deposits, rather homogeneous and with abundant cultural remains are connected with the Early Neolithic “Impressa” pottery. These do not resemble closely the above mentioned “homogeneous” deposits, nor traces of “layer-cake” sequences can be observed. A complex and unorganised mix of several components can be observed at microscopic scale: large charcoal fragments, organic matter at various stages of ageing or charring, bone, snails, ash, phytoliths, and faecal spherulites are usually present.
- 2) “Layer-cake” deposits are usually connected with Middle to Late Neolithic, and sometimes Early Copper Age cultural horizons. Few thin black lenses are interfingering within white layers that are rather thick (up to 20-25 cm) and finely laminated. At microscopic scale, these laminae are organised in a cyclical pattern of three main *facies*: wood ash, phytolith-rich, and coprolite-rich.
- 3) Typical “layer-cake” deposits with thin white horizons become dominant from the Bronze Age onwards.

The occurrence of faecal spherulites and coprolites shows that all these deposits originate in some way from the pastoral use of the caves. The brownish homogeneous deposits (1) are apparently mixed and reworked *ab antique*. Here, the “pastoral” component is not dominant, while indicators of domestic activities are common and usually associated with abundant cultural remains. This suggests that the caves were used more or less continuously by unspecialised groups together with a small number of animals. This hypothesis is supported also by the cultural remains, among which common tools that can be referred to various non-pastoral activities.

The thick white “layer-cake” horizons (2), and the peculiar lamination inside them, are clearly of pastoral origin and include less evidence of domestic use. Each repetition of the three microscopic *facies* probably corresponds to a phase of stabling, possibly seasonal as suggested by faunal data; nevertheless, the dung was burned occasionally, once every several seasons, each combustion marked by a black horizon (Iaconis, 2003). All this data indicates that the caves were used by moderately specialised groups of shepherds from the Middle Neolithic to the Copper Age. The sites were frequented seasonally for domestic uses and as stables for flocks of limited size, which accumulated minor quantities of dung that was burned only when necessary.

Starting from the end of the Copper Age, specialised groups of transhumant shepherds with large flocks used the caves seasonally, burning the dung deposits every year after the abandonment of the site, originating typical “layer-cake” deposits (3). The hypothesis is corroborated also by the occurrence of cultural remains that are typical of pastoral people, like milk-processing vessels, spinning wheels and other wool processing tools.

## **Conclusions**

The importance of the caves as pastoral sites increased steadily from the Early Neolithic onwards. Differences in use through time are connected to different economic systems, in which open-air sites and caves played more and more specialised roles (Boschian, 2000). The Early Neolithic settlement was rather sparse and the groups relied on mixed agropastoral resources. In this period, caves were probably used by small groups of partially nomadic groups, but the relationships with the open-air sites are still unclear, even if they are clearly demonstrated by the typology of the cultural remains.

The settlement became denser and denser during the Middle Neolithic-Copper Age, and large open-air settlements developed in the lowlands or in the hill areas, while shepherds started using the caves seasonally, partly to keep the flocks far from the fields during the vegetation period. It is still unclear whether the shepherds were specialised, or conversely were small groups of farmers that left their villages during the transhumance season. In any case, contacts between the villages and the shepherds are demonstrated by the occurrence in caves of ceramic vessels that are typical of the villages.

Eventually, specialised groups of transhumant shepherds started using the caves for stabling their flocks during the Bronze Age, when the settlement increased and complex societies developed. These two processes respectively requested that the flocks were kept far from fields and gardens, and secured the ways of transhumance through the territory.

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