

Speleothems as raw material during the Middle Paleolithic: examples from Level R and Ra at the Abric Romaní site (Barcelona, Spain)

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Abric Romaní site

Located in Capellades (Barcelona, Spain, **Figure 1**). Long stratigraphic sequence: 18 archeological levels excavated up to now [A to Ra] dated to ca. 40 ka till 100 ka (Sharp et al. 2016; Bischoff et al. 1988, 1994). All the levels except level A belong to the Middle Paleolithic.

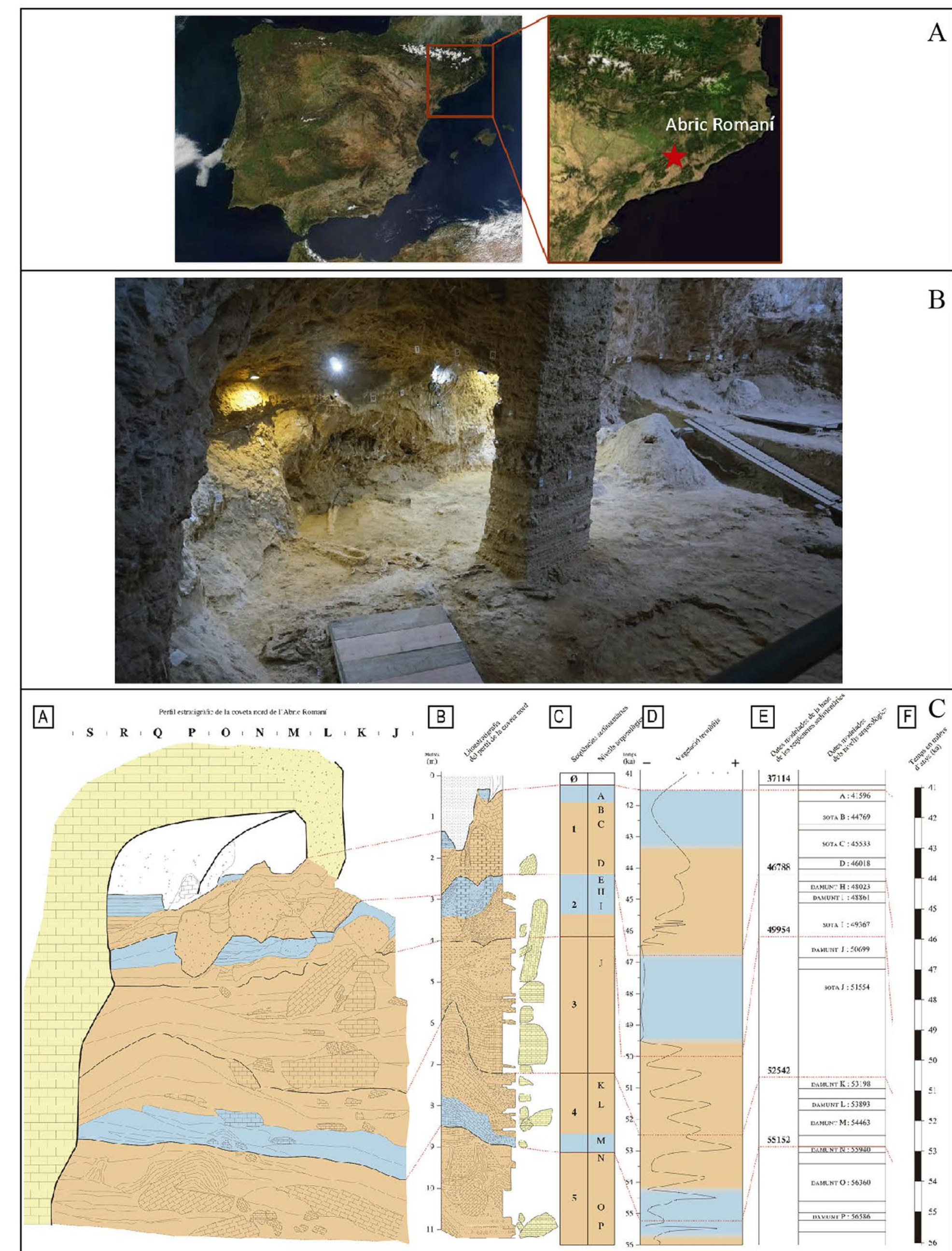


Figure 1. (A) Location map of the Abric Romaní; (B) General view of archaeological level R (Photo P. Saladié/IPHES); (C) Stratigraphy and dates of the archaeological levels excavated until level P: A. stratigraphic profile, B. lithostratigraphy, C. Sedimentary sequence and archaeological levels, D. Vegetation, E. Dates, and F. ka years (Vallverdú 2018; Vaquero et al. 2013)

Level R & Ra

The excavation of stratigraphic unit R levels began in 2013 and is still in process. Two different occupational moments (separated by a sterile level) have been identified (R & Ra). The total number of archaeological remains recovered to date is of 5 267 (fauna: 1 324, lithics: 724, others: 3 219). These levels are date ca. 60 Ka. The preliminary results show that the faunal assemblage is composed almost exclusively by red deer (rare remains of others taxons as horse, goat and rabbit). We should point out the higher number of hearths (almost forty) and wood remains (firewood and some tools).



Figure 2. Detail of the archaeological material during the excavation of Ra level. **○** shows the knapped speleothems associated to hearths, faunal remains and lithics remains (chert, quartz & limestone) (Photos P. Saladié/IPHES)

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Technological attributs

The variability of raw materials used in the Middle Paleolithic lithic assemblages depends on several factors associated to several factors including the availability of resources, type of occupation, and knapping strategies among others. At the Abric Romaní site, the main raw material used is always **chert** with percentages between **80%** and **60%** of the total lithic assemblages. Other raw materials are also used, mainly **quartz** and **limestone** and sometimes "very secondary" stones with a bad aptitude for knapping as the **slate** (e.g., Level J and M, Vaquero et al. 2012, Chacón 2019).

In **levels R and Ra**, a large number of speleothems (**N= 444**) associated with lithic tools, faunal remains and hearths have been recovered. Already during the excavations most stigmas related to knapping activities were identified on several speleothem remains (**Figure 2**):

Level R= 290 - 36.9%, Level Ra=154 - 11.2% (percentages on the total lithic assemblage by level)

After the preliminary technological analyses the **main technological attributes** of anthropogenic modification are:

(1)Type of supports: fragments of flowstone, stalagmites and stalactites.

(2) Strategies of exploitation: different depends on the type and its morphology

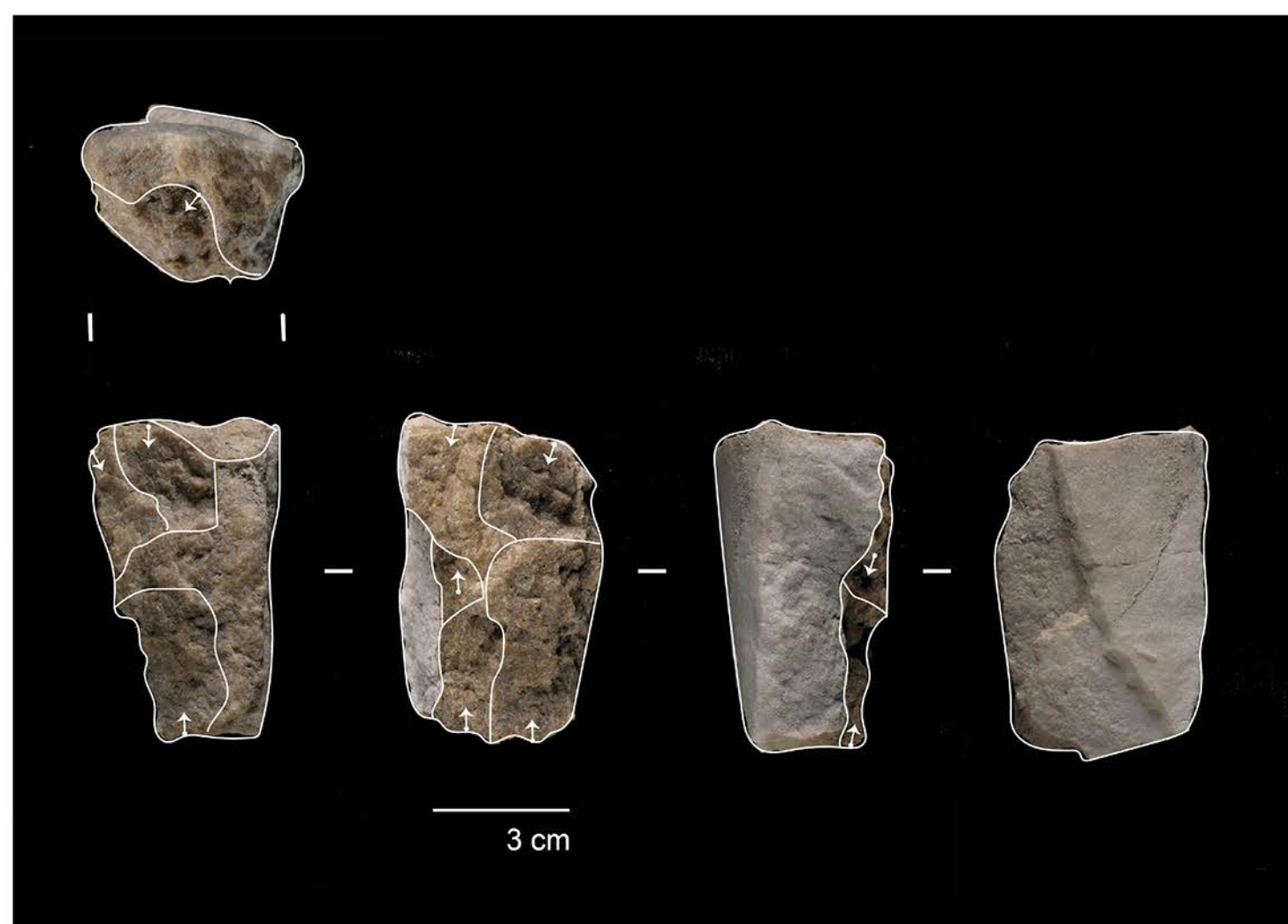
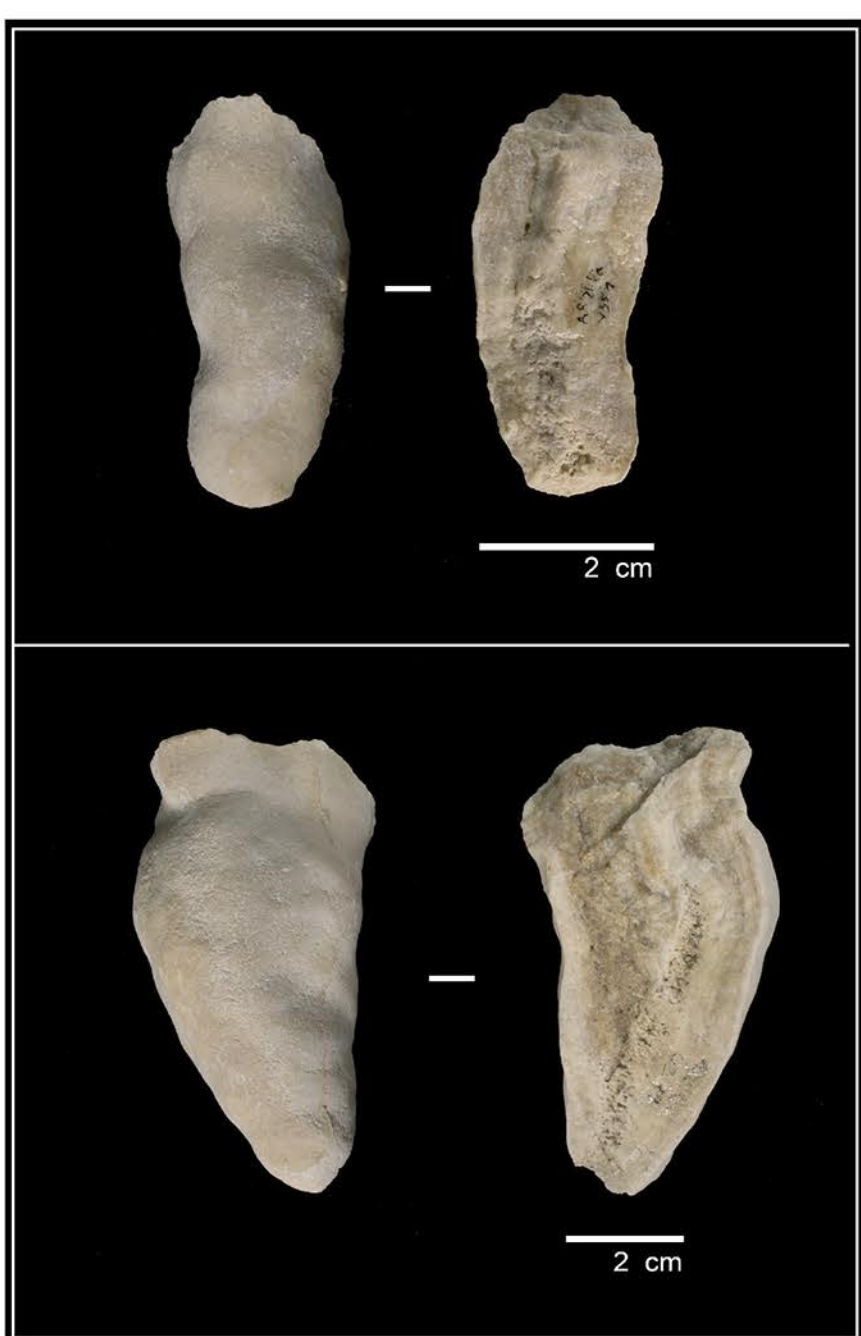
2.1. Flowstone fragments present short series of unifacial centripetal removals. In some cases, they show few isolated alternate bifacial removals.



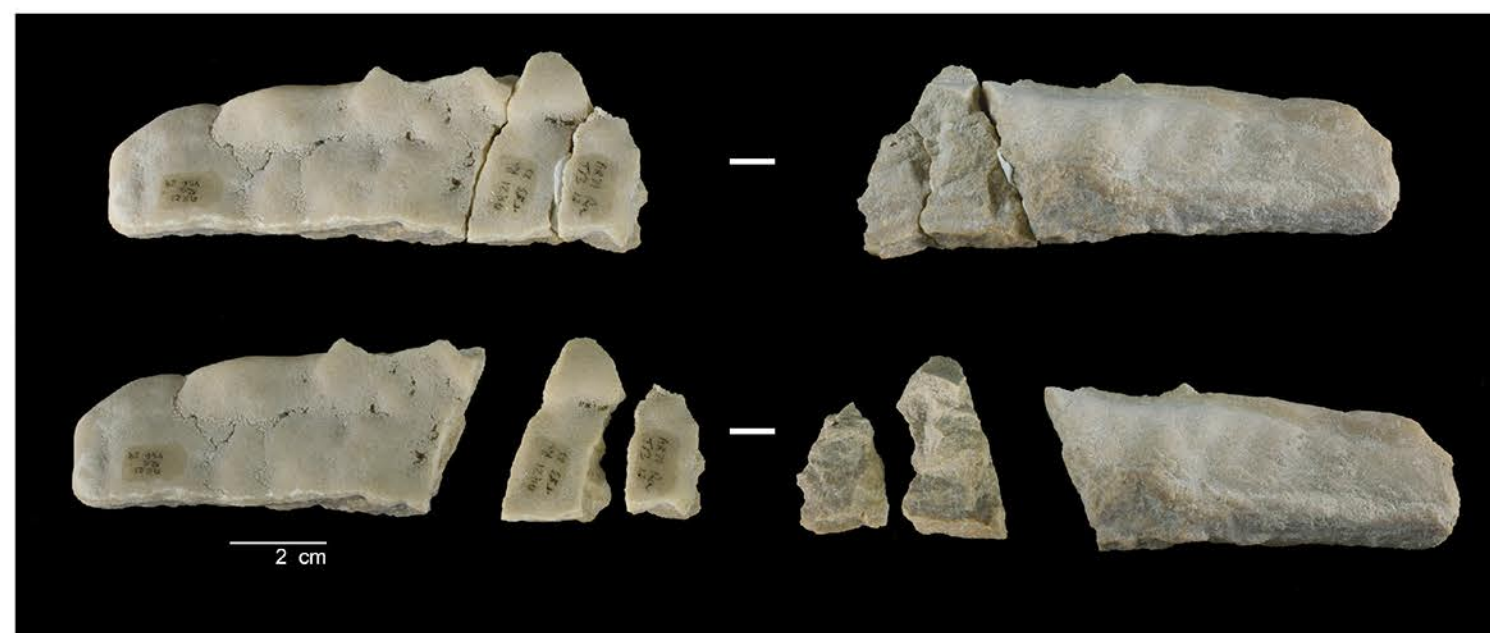
2.2. Stalagmites and stalactites two different strategies to obtain flakes, always on anvil and using hard hamerstones, due to the hardness of the speleothemes. The typical attributs of this type of knapping technique have been identified in cores and flakes:

* Divided in two parts along the longitudinal axis of the fragment by split fracture

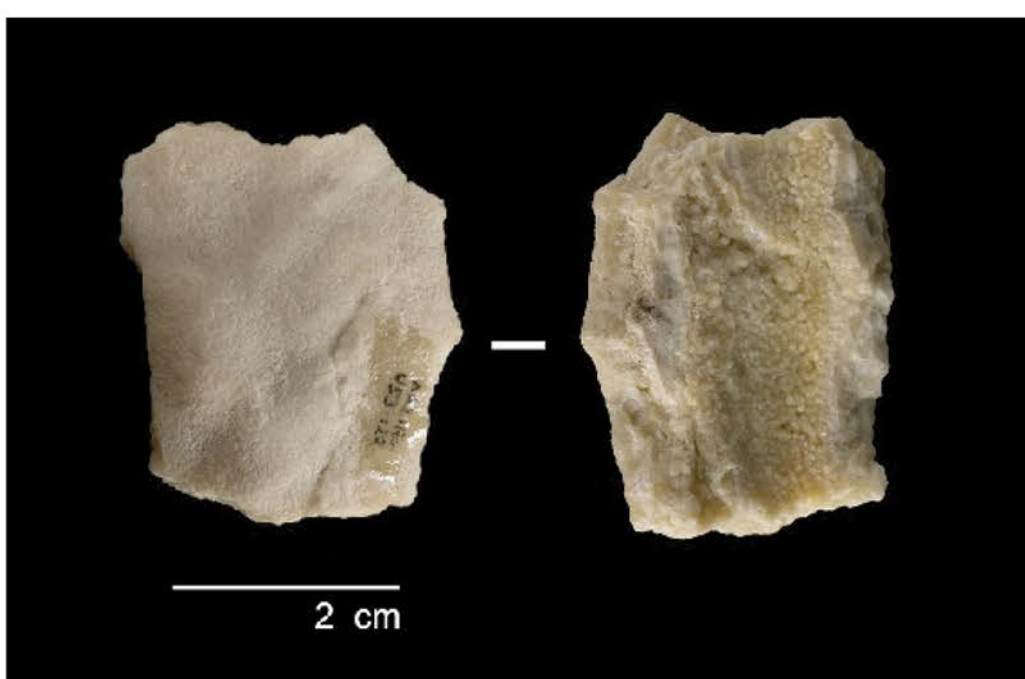
* They are knapped through unipolar longitudinal removals or through bidirectional removals



Some refits have been identified attesting the strategies and techniques recognized.



(3) Retouched artifacts: mainly notches and denticulates. The retouched is always unifacial and abrupt. Perhaps the retouched have been made using freehand techniques but we cannot discard that even the retouch could have been made on anvil.



Conclusions

These repetitive and systematic technological patterns allow us to propose that speleothems have been used as a complementary stone raw material in the frame of the technological reduction sequences developed during the occupation of these levels.

But, (1) Why are Neanderthals using this material if other stones are available and with a better aptitud to cut and to knapp? (2) Do these resources give an advantage in some specific subsistence activities (ex. woodworking???...hideworking???) ? ... The study of these items is still preliminary, and many questions are still unsolved.

Trying to answer them two different experimental programs have being designed and are in progress. First, a knapping experiment to repet the same strategies in order to obtain the same products. Second, the use of the products in different activities (specially the carcass processing and the woddd processing). Lastly the usewear analysis will be done on the archaeological & the experimental material.

Photos of the knapped speleothemes:
(M.D.Guillén & M.G.Chacón/IPHES – F.Romagnoli/UAM)