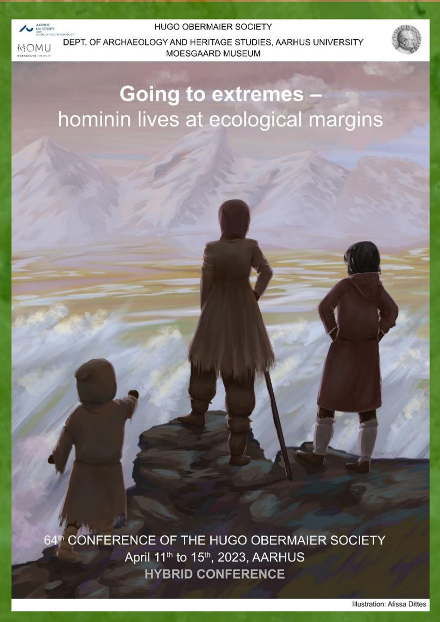

IDENTIFYING NEANDERTHALS KNAPPERS IN THE ABRIC ROMANI ROCKSHELTER

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INTRODUCTION

Archaeological sites are the result of past human activities, and this includes stone knapping. By isolating these knapping events, we can obtain information about individuals and carry out studies on skill and knowledge. As mentioned in recent studies (Assaf, 2021; Klaric, 2018; Forte,2023) show that different degrees of expertise in stone knapping affect the variation of the lithic record. To raise and track these individuals in the record can help us to understand and interpret the technological variation within a settlement. In this study, we aim to recognise these behavioural learning skills through direct evidence such as knapping core. So how can we identify individuals? The embodiment of a technique ensured by repetition in sequence time can allow us to identify inter-individual variations (Bril, 2018; Gandon et al. 2020) in a lithic assemblage. In order to ensure this objective, we first need to isolate the lithic remains belonging to the same settlement, as this will allow us to compare them and identify their characteristics. Then, we have separated the lithic remains belonging to the same knapping event in order to study them in detail. Finally, we have compared the different technical characters between the different lithic remains in order to identify repeated sequences as errors or accidents and, therefore, individual skills. Thus, the combination of these analyses allows us to identify and interpret technological variation in archaeological evidence, and to better understand how people learn and develop their woodcarving skills.

Fig. 2. View of level Ob surface in 2010

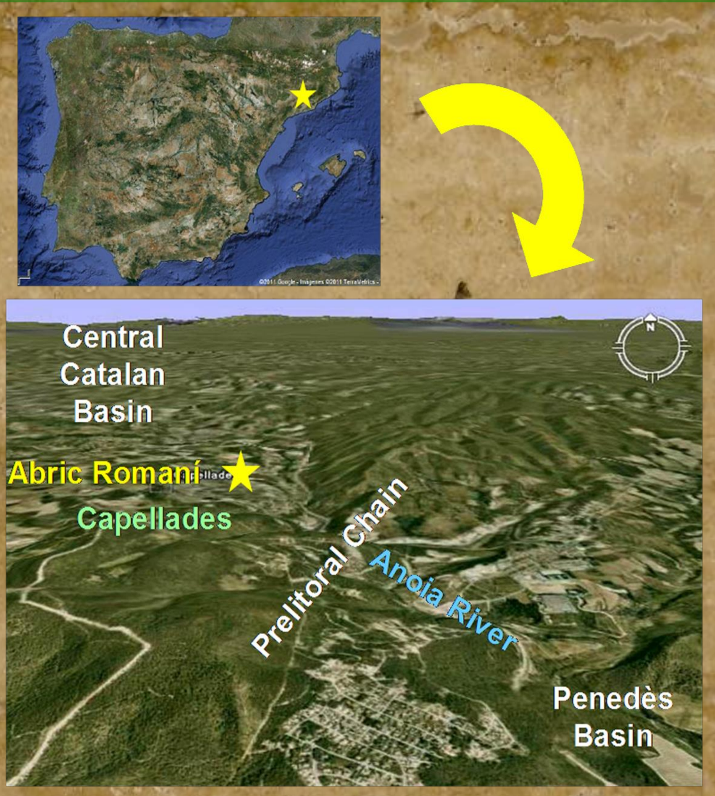


Fig. 1. Location of the Abric romani site

THE ABRIC ROMANÍ ARCHAEOLOGICAL SITE

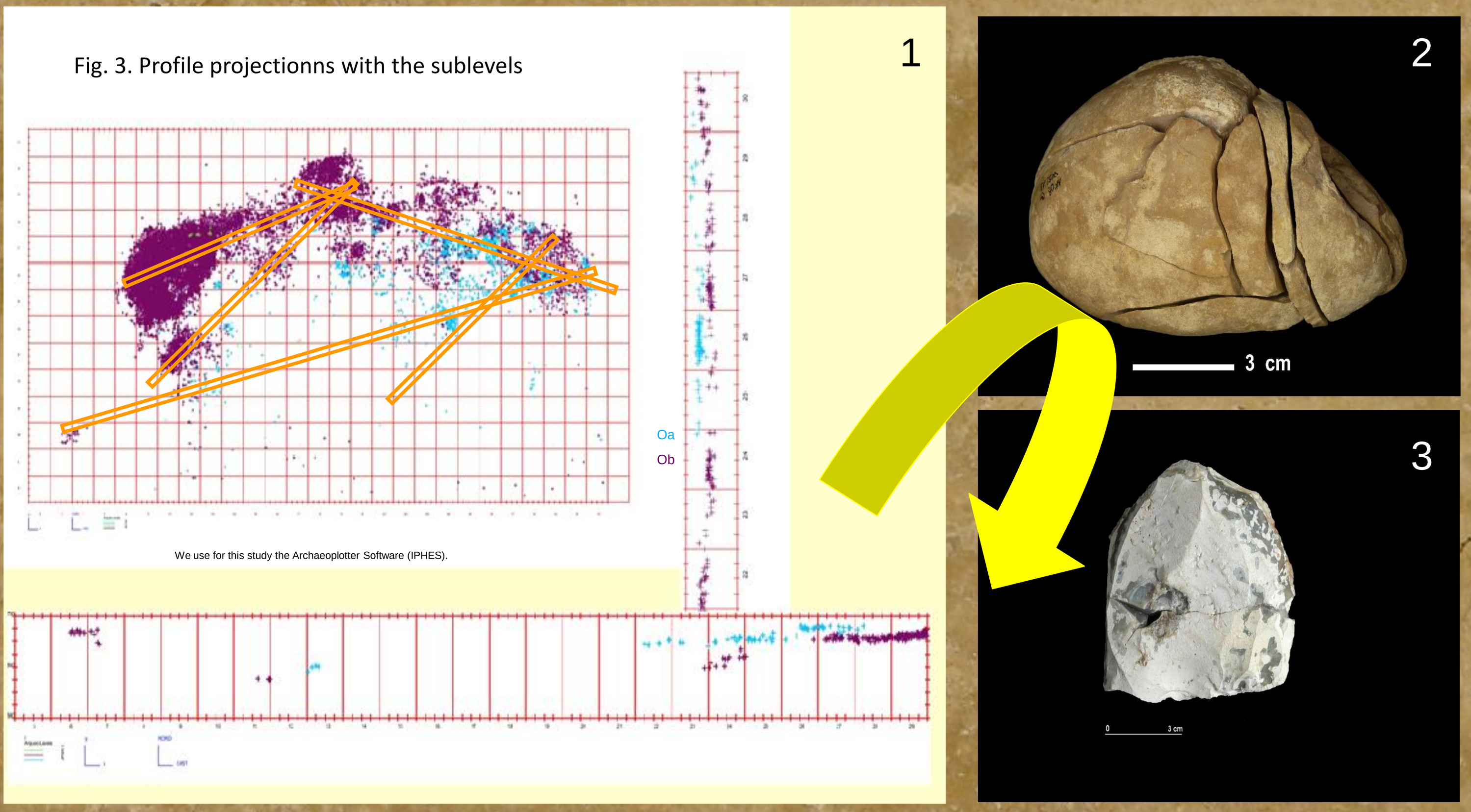
Abric Romaní is an important archaeological site for the study of Neanderthal population dynamics during the Middle Palaeolithic period. It is located in the northeast corner of the Iberian Peninsula in Capellades, Barcelona, Spain. The site is a rock shelter formed at the mouth of a cave on the side of the "Cinglera del Capelló," a cliff cut by a tectonic fault and the Anoia River. The 30 meter stratified travertine sediment sequence contains approximately 25 archaeological levels, which appear as thin layers intercalated between travertine platforms. The sequence has been dated using the U-series to between 40 and 110 ky BP (Sharp et al., 2016).

The alternating layers of archaeological and sterile levels allow for high-resolution archaeological studies, identifying archaeological stratigraphic events (Bargalló et al., 2016). The site is known for the exceptional preservation and documentation of fires (Vallverdú et al., 2012), wood remains, and numerous lithic and faunal artefacts. Multidisciplinary studies conducted at the site have shown how Neanderthals organized their living space at the campsite and what activities they performed. This has led to suggestions of specific cognitive and socio-economic capacities, but always at the population level.

THE LEVEL O

Level O is dated by the U series to around 55 kyr. Excavated from 2004 to 2011, it has so far yielded 31,240 remains. Among these remains are: lithic technology (23,374), faunal remains (7,849), charcoal (3,524), wood tools (107) and combustion structures (19). The current excavation surface area is over 300 m². This allows for studies of spatial distribution.An archaeo-stratigraphic study (Bargalló et al. 2016) has shown that there are at least two sublevels: Oa (1585 lithic remains) and Ob (21789 lithic remains). In this work, we will go a step further by identifying some individual aspects of technological behaviour. This new line of work has two antecedents: a) the estimation of the average number of individuals in a single occupation (Borell, 2018) and b) the identification of the laterality of the carvers through the analysis of lithic debitage (Bargalló et al. 2017). The main objective of this study is to identify some of the individuals who knapped lithic tools at the Ob archaeological level.

Fig. 3. Profile projectionns with the sublevels



METHODOLOGY

1) **Archaeostratigraphic study** to break down as much as possible the archaeological levels and provide as much information as possible about the remains of the same settlement (Bailey, 2007; Bargallo et al. 2016).

2) Every recovered lithic remain was analysed **raw material** (Machado, 2011), **debitage analysis** (Carbonell et al. 1992) and **refitting analysis** (Vaquero, 2008). These studies allow us to identify the different knapping areas and to identify the lithic remains resulting from the same knapping event. This individualisation of the lithic remains helps us to get closer to the identification of the lithic knappers. The analysis of a set of lithic remains, the analysis of the organisation of the knapping stone tools, the identification of unresolved errors during production and the knapping patterns have allowed us to identify some individuals who stand out for being novices or individuals with few knapping skills.

3) In this case we have focused on the **analysis of the cores** as they show the maximum information about the methodological character leading to the study of the knapping skills as well as the volumetric management (Assaf, E. 2021).

RESULTS

In level O were identified 107 cores, 51 core on flakes, 7 core fragments. In this study we centred the study only in the flint cores (n=129), because is the raw material is more homogeny and there are most numbers of cores. The technological analysis recognized 6 Levallois preferential cores, 16 Levallois recurrent unidirectional core, 80 Levallois recurrent centripetal cores, 11 orthogonal cores, 9 opposites cores, 3 cryptogenesis cores (exhausted) and 4 indeterminate cores.

	Core	Core on flake	Frag. Core	Total
Limestone	14	2		16
Quartz	1	2		3
Flint	81	43	5	129
Agate	11	4	2	17
Total	107	51	7	165

Table 1. Raw Materials and types of the cores.

	Unipolar	Centripetal	Levallois	Orthogonal	Opposites	Cryptogenesis	Others	Total
Core	6	52	5	8	4	2	4	81
Core on flake	10	23	1	3	5	1		43
Frag. Core		5						5
Total	16	80	6	11	9	3	4	129

Table 2. The knapping methods and type of the cores.

All most cores present portions of cortex of secondary face core. The majority of the cores analysed are located in the middle to late stages of full exploitation, with most of them conserving the methods of Levallois exploitation intact. The majority of the cores are bifacial, although unifacials are also well represented, especially in the cores on flakes, since the morphology of the flake itself allows for a volumetric control of the Levallois knapping on the hierarchical face with almost no exploitation of the secondary face.

	co(nco)	nco(co)	nco	Total
Core	4	57	20	81
Core on flake	3	30	10	43
Frag. Core		4	1	5
Total	7	91	31	129

Table 3. Cortex in cores of level Ob.

	Initial	Middle	Final	Total
Core	3	34	44	81
Core on flake	12	11	20	43
Frag. Core		1	4	5
Total	15	46	68	129

Table 4. Explotation stage of the cores.

	Unifacial	Bifacial	Trifacial	Multifaced	Total
Core	5	68	5	3	81
Core on flake	26	15	1	1	43
Frag. Core		5			5
Total	31	88	6	4	129

Table 5. Faciality knapping of the cores.

If we look at the exploitation angles of the cores, most of them have angles between flat and simple, which allow them to obtain deep flakes or very deep flakes, thus maximising the exploitation surfaces and obtaining the largest possible flakes with a reduced thickness. In summary, this group of cores is characterised by a high degree of standardisation and fully developed Levallois knapping. Among them, we have identified the technical features defined by Boeda (1994) such as the hierarchy of the volume with the differentiation between the flaking surface and the surface of the preparation of striking platform and the direction of the fracture plane, parallel to the plane of intersection of the two surface.

	0-15º	16-35º	36-55º	56-75º	76-90º	Total
Core	15	35	13	9	9	81
Core on flake	9	21	8	1	4	43
Frag. Core		3	2			5
Total	24	59	23	10	13	129

Table 6. Angle knapping of the cores.

	marginal	deep	very deep	total	Total
Core	7	49	22	3	81
Core on flake	9	19	14	1	43
Frag. Core	1	4			5
Total	17	72	36	4	129

Table 6. Maximum depth of flake removal cores.

Figure4. Example different types Levallois cores.

IDENTIFY INDIVIDUAL WITH LOW SKLL KNAPPERS

Among these homogeneous cores, we have identified some cores that present serious problems in knapping:

Repeated knapping mistakes(shot removals, repeated hinges, steps, crush....)

Unsuitable angles (Between 50-69º or 90-110º)

Selection of low quality material and inability to over come raw materials distrubances (low explotation degree)

The identification of these robust markers of knapping skill, such as the frequency and repetition of errors in the knapping process, has allowed us to establish a clear relationship between the degree of structure of the technology of the cores and the degree of knapping skill of the knappers from Level O of the Abric Romani.

SPATIAL DISTRIBUTION

If we observe the spatial distribution of the cores with respect to the rest of the remains of the lithic remains, we can see that they show the same pattern. Many of these lithic refits are made up of cores, with their own flakes, fragmented cores and newly knapped cores, cores that have been recycled in retouched tools... Unlike other sites (Assaf, 2021; Bodu et al, 1990), in this case we have not been able to identify a specific area where the cores with low knapping skills, but they are located in the three large accumulations of debris together with the rest of the cores with well-stabilised and controlled knapping.

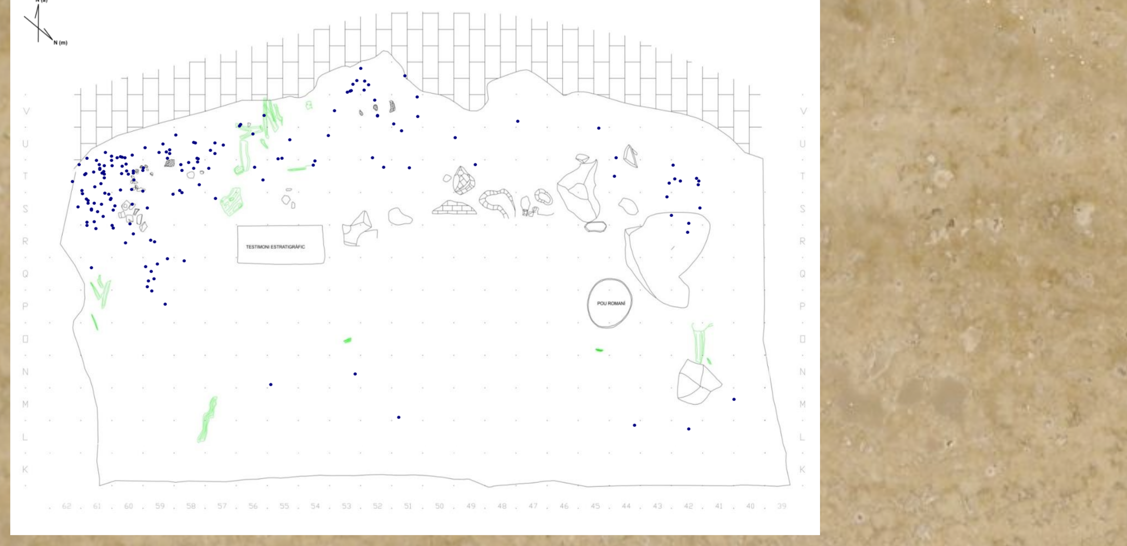


Figure 5. Spatial distribution of the cores in archaeolevel Ob.

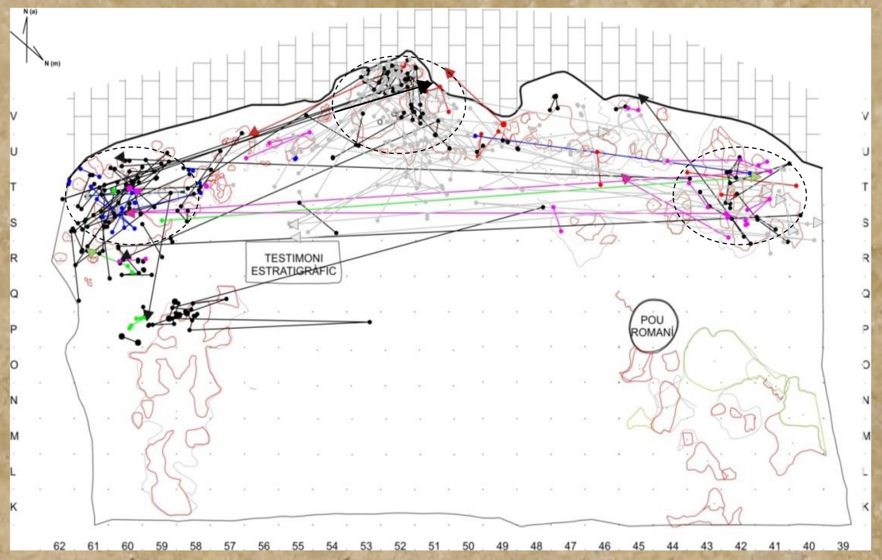


Figure 6. Spatial distribution lithic refits and conjoin in flint identify in Ob..

DISCUSSION AND CONCLUSIONS

In this study, we have shown how to identify some individuals from the degree of knapping expertise of Neanderthals from level O through the analysis of the core type. Based on a series of characters and technological errors and their repetition, we have been able to understand part of the variability in the exploitation methods of the O level cores, but at the same time it has also helped us to shed light on aspects that are invisible or forgotten in archaeology, such as children. Through the multidisciplinary studies carried out in this level, it was possible to identify that it was the result of the long-lasting settlement of a group of Neanderthals (Borell, 2018). It is reasonable to think that this group also included infants and that we can identify them from their knapping practices, as has happened in other studies at other sites (Assaf, 2021; Castañeda, 2018).

In conclusion, after having analysed 129 cores, we have been able to identify 3 types cores that would be the result of the knapping of individuals with low knapping skills. Due to the small size of some of them and the poor management of knapping as well as the successive errors in decision-making, even selecting very poor quality flint, we hypothesize that these remains were knapped by Neanderthal infants.

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