

## Variability of the levallois and discoid methods at the middle Paleolithic of north-east Catalonia: Puig Marí (Maçanet de la Selva) and Can Planiol (Santa Coloma de Farners)

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### Abstract

The research project that we present is a study of two sites Puig Marí (Maçanet de la Selva) and Can Planiol (Santa Coloma de Farners). Both Puig Marí and Can Planiol sites are located in the Selva depression (north-east Catalonia) and it is framed within the research project *The paleosettlers of the middle Pliocene: its technological evolution in the Selva depression and Puig Marí volcano*. Both sites are located in the middle Paleolithic, which introduce us in the technological variability of this period. The following point is analysis and interpretation of morphotechnical characters are the main points of the tecnocomplex study. Of middle Paleolithic since they contribute to understand the variability of the technical systems of this period adaptation. The methodology used in this report is Logic-Analytic System with our new contribution. This change we better understand all the possible aspects of lithic technology of middle Paleolithic. The results that we can obtain of this study show us the different knapping strategies. But we think that the different knapping they must be understanding in site the operative systems. This variability in the core are the result of different knapping times of the core.

**Keywords:** Middle Paleolithic, levallois, discoid, Puig Marí, Can Planiol.

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### Introduction

The main goal was to perform a technological analysis in order to characterise the exploitation methods of the Puig Marí site and its comparison with the exploitation methods of the Can Planiol site. The following goal was to try to identify which morphotechnical characters of levallois method are different from discoid method.

On the other side, we also contrasted the validity of the different levallois methods identified by Boëda, and we integrated them in our methodology to compare the obtained results.

### Methodology

The analysis method used in this research is based in the Logic-Analytic System (Carbonell, *et al.*, 1992). The LAS is an open system and, thanks to this fact, we were able to make some

variations to adapt it and better understand all the possible aspects of lithic technology of middle Paleolithic. Briefly, the variables used are the following:

- Study of core symmetry from two different points of view: symmetry of sagittal edge, variable already present in LAS, and volumetric symmetry (Carrion, 2006) from the intervention plan (Terrades, *et al.*, 1993), variable taken from the methodology developed in the study by Boëda (Boëda, 1993, 1995; Boëda, 1994).
- Identify the location of flakes in the core (Rodríguez, 1997)
- Note if there is hierarchical surface in the core or not.
- Note if there are negatives of predetermined flakes or not.

- Identify the exploitation status in which each core would be (Vaquero, 1991-92).
- Identify the different exploitation methods defined by Boëda (Boëda *et al.*, 1990), in the case that cores were exploited with levallois method.

These new variables were a key fact to interpret and understand the exploitation methods and their variability in Puig Marí and Can Planiol site.

## Results

Both Puig Marí and Can Planiol sites are located in the Selva depression (north-east Catalonia). In Puig Marí site (Bargalló, 2007; Bargalló *et al.*, 2003; Garcia *et al.*, 2005; Martínez *et al.*, 2006; Sala *et al.*, 2002), the hegemonic raw material used to obtain flakes is basalt; meanwhile in Can Planiol site (Soler *et al.*, 1998), the hegemonic raw material is quartz.

The sourcing of these raw materials it's right in the centre of sites. On the other hand, in Puig Marí we identified sporadic inclusions of alocton raw materials like quartz (mainly), and flint, porphyry, granite, hyaline quartz and chert (occasionally).

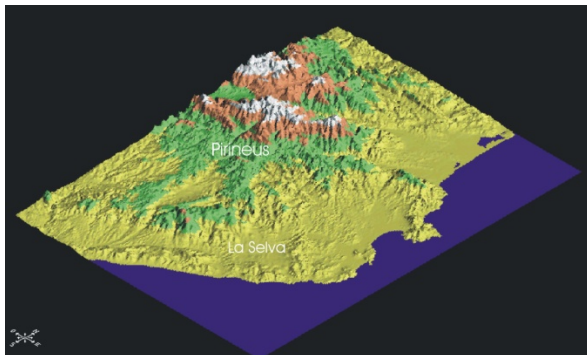


Fig. 1. Location of Puig Marí and Can Planiol.

From the technological study performed in Puig Marí site, we documented all operative systems. The exploitation methods identified are levallois and discoid methods. As for the levallois method, we identified all exploitation strategies developed throughout all production phases. On the contrary, the discoid method was only documented on the last exploitation phase with a biconical morphology of the core.

The need to widely document the technological complex of discoid method forced us to look for another site. This is the reason why we included Can Planiol site, where discoid method was the



Fig. 2. Puig Marí lithic industry.

only one documented. From the results obtained in both morphotechnical analyses of technological complexes, we reached the following conclusions:

- Facial character: it does not show different exploitation methods, but informs us about the appropriate exploitation according to volumetry and/or morphology of the natural base. This character informs us about the exploitation time of the core.
- Obliquity character: in levallois method is SP/S. The SP angle corresponds to the exploited surface and the S angle is the result of the negative flakes performed to prepare striking platforms to correct the exploited face angle. On the other hand, in discoid method, this character is S/S, which shows us that both faces are exploited with the same angle and intensity.
- The negative flakes orientation character in the core shows us the method used. At the same time, it gives us information about the order of the different exploitation strategies according to each exploitation status.

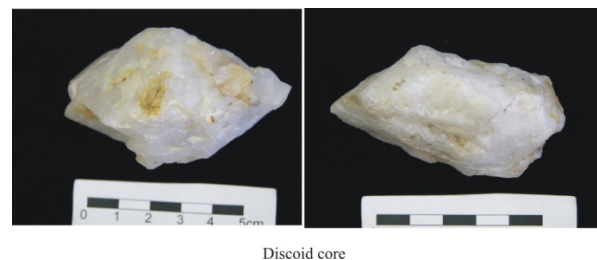
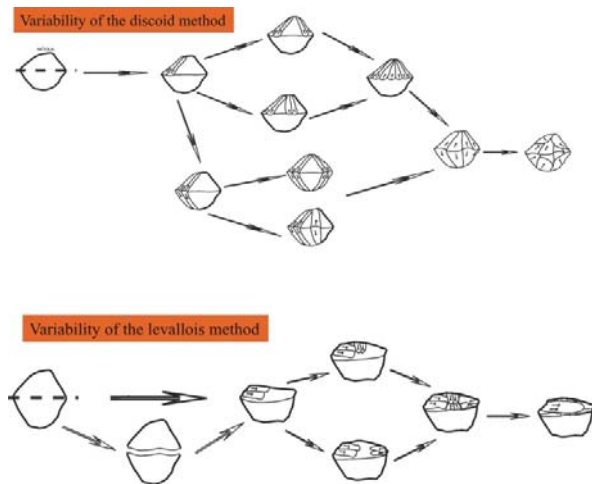


Fig. 3. Can Planiol lithic industry.

## Discussion and conclusion

The study of lithic industry understood within the operative field (Guilbaud, 1995) enabled us to document the internal variability of the studied technological complexes. We identified that they belong to different knapping time. In this way and from the study performed, we documented that the different levallois types identified by Boëda are better represented in the middle and last exploitation stages. To us, these types did not correspond to different levallois modalities, but to different phases of levallois methods (Bargalló, 2007). We supported this hypothesis with the results obtained from the identified morphotechnical characters in the levallois cores from Puig Marí site, since no morphotechnical difference was observed. This fact proves that it is the same exploitation method. The diachronical location of exploitation strategies in each knapping method enabled us to contrast the hypothesis stated by Boëda. This hypothesis is based in different levallois types. We reached the conclusion that these types can not be identified as exploitation entities on their own. These types are the result of different knapping times of the core.



**Fig. 4.** Interpretation the variability of levallois and discoid method.

As far as the middle Paleolithic hominid cognition is concerned, there are many researchers that believe that they had a clear mental image of the exploitation procedures of raw material (Barton, 1988; Boëda, 1994; Mithen, 1996; Schlanger, 2002; Wynn and Coolidge, 2004). This means that hominids followed mental patterns when executing a certain knapping. The conclusion that we reached

is that the lithic material analysed does not follow this hypothesis. We believe that hominids obviously knew the object that they wanted to obtain. What they did not know were the manufacturing process because they adapted it to the specific needs of each moment. We interpreted that hominids had a technological background acquired from learning and experience. This background enabled them to adequate knapping to the different unforeseen events that could arise (Stout, 2002). This is one of the factors that produced technological variability.

As for the different management of raw materials (Lenoir and Turq, 1995; Peresani, 1998, 2003), we observed that the cores exploited through discoid method (knapping documented both in quartz and basalt) show a high control of this method, which is not determined by the raw material quality. On the contrary, levallois method can somehow be determined by a different stone type management, since it was just documented in basalt and chert but not in quartz. This fact gives us information about a different raw material management, indicating the complexity of the conceptual and operative outline (Garcia, 2005; Marks *et al.*, 2001; Rodríguez, 2004). As technique control increased, it could not produce a different stone management. This hypothesis is supported on the documentation found in Avellaners site, in the Selva depression, where levallois knapped quartz were documented.

In conclusion, we identified the following facts that have an influence on the choice of one method or the other:

- Pebble volumetry, since it can initially determine the obliquity character of the exploitation.
- Raw material crystalline construction.
- Obliquity angle of the negative flakes in the core.
- Volumetric conception during core exploitation.
- Hierarchy of faces.

Furthermore, we widely documented the internal variability of both methods, being able to identify the different knapping strategies that can be used during the exploitation. This interpretation was done thanks to operative systems, which enabled us to understand lithics artefacts through an interconnections network. In this way, we have been able to identify the different hominid decision phases when using one exploitation method.

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Stampato presso  
Cartografica Artigiana snc  
Ferrara  
Novembre 2008