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Where were Neanderthals collecting their stones? Investigating lithic raw material procurement strategies in Pinilla del Valle (Madrid – Spain).

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Lithic raw material procurement strategies during the Middle Palaeolithic in Pinilla del Valle (Madrid, Spain) is the focus of my ongoing Ph.D. thesis. The aim is to identify and assess the procurement strategies and management of the lithic resources in relation with the activities and sites occupied by Neanderthal (*Homo neanderthalensis*) populations.

The hill of Calvero de la Higuera in Pinilla del Valle (discovered in 1979) has been identified as one of the many sites occupied by Neanderthals in the European territory. It is comprised of a series of rock shelters forming part of an old cave system situated 1100m above sea level, in the National Park of Guadarrama Sierra (Fig. 1). This site has been used as shelter by both humans and animals for extended periods of time spanning from the Middle Pleistocene to the Holocene. Here we found evidence of the activities Neanderthals partook in their day to day lives including, hunting, diet and the building of hearths.

An interdisciplinary team of archaeologists (such as myself), geologists, biologists and palaeoanthropologists, are working together to study the Neanderthal occupation of Pinilla del Vale. The data collected aims to shed light on: past climatic and environmental conditions; Neanderthal behaviour; resource availability (lithics) and use; in an evolutionary, spatial and temporal context. Currently three of the main research interests of

the archaeology team focus on the study of Mousterian industry (typical stone tools made by Neanderthals). The objectives are: i) to understand the process of tool making; ii) use-wear, that is - to understand what the different stone tools were used for through the study of trace marks left on the tool; and to iii) identify the possible sources of the different raw materials, (i.e., finding the geological deposits explored to make the stone tools).



Figure 1: Cueva Descubierta – Pinilla del Valle during the excavations in 2014.

This site is particularly significant owing to its location in the centre of the Iberian Peninsula; the presence of *Homo neanderthalensis* remains and the variety of raw materials used in tool making (Fig. 2). The analysis of the different raw materials is currently being investigated; however, initial findings suggest that the stone tool assemblage of Pinilla del Valle is mostly composed of quartz (more than 70%). This is considerably different from most other contemporary sites across Iberia which are mostly composed of chert and, in the western-most areas, quartzite. Usually the most common raw material on site is also the most abundant in the region and we already have knowledge of some possible sources near the site. What is curious about quartz is that this raw material has a distinct physical behaviour when compared with other siliceous materials that tend to be more homogeneous. Quartz, when struck, can break into irregular chunks, which makes it more difficult to knap into the desired shape. We have to take into account that there can be variations in the quality of the mechanical properties of a raw material that influence its behaviour and therefore the way it is exploited. The uncertainty of this breakage is a likely reason to suggest why it was rarely used in favour of other lithics for using the Levallois technique representative of the Mousterian technology, nevertheless it produces very sharp edges and, because it is the most abundant mineral in nature, it is easy to find, saving time

and energy to past populations. Further research is needed to understand this and other questions.

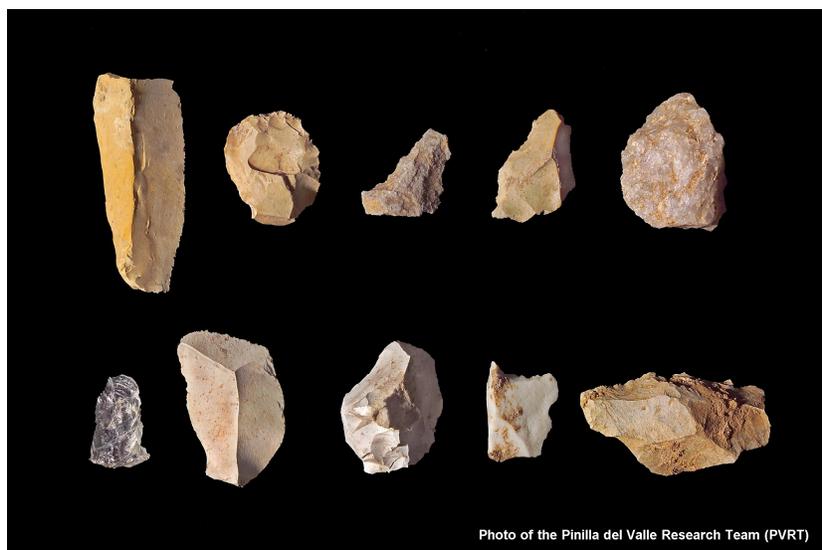


Figure 2: Examples of lithics from Pinilla del Valle.

The study of lithic raw material procurement is important to understand Neanderthal behaviour traits such as his mobility through the landscape and resources exploitation. The two basic questions we pose are “where from” and “what for”. To study the origin of the sources of lithic raw materials the archaeologist has to resort to geological and geochemical methodologies. Nowadays we have at our disposal a wide range of analytical techniques such as SEM, Raman Spectroscopy, PIXE, XRF, among others, to analyse the chemical, physical and mechanical characteristics of the different rock types from which the stone tools are made from. The comparison of these stone tools to rock samples collected from known geological outcrops found during geological surveys around the local area provides reasoning for material use stemming from availability, transport and movement. By studying the origin of raw materials in relation to tool use, technology and typology, we hope to better understand patterns of Neanderthal behaviour, but also how the availability of raw materials influence the process of material collection and tool making to give more in depth indication of Neanderthal cognitive capacities and adaptation.

Editors

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