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Quartz and quartzite refits at Gran Dolina (Sierra de Atapuerca, Burgos): Connecting lithic artefacts in the Middle Pleistocene unit of TD10.1

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ABSTRACT

This paper expands upon the preliminary refit analysis of the NW area of unit TD10.1 at Gran Dolina (Sierra de Atapuerca, Burgos, Spain) (López-Ortega et al., 2011). The refit study described here has been conducted on the quartz and quartzite assemblage recovered from unit TD10.1, consisting of a total of 4302 artefacts (709 quartz and 3593 quartzite pieces). Following the previously established methodological protocol, we found additional elements associated with already known connections as well as new refits in quartz and quartzite. The association between refits and raw material units (RMUs) has allowed us to distinguish specific concentrations and spatial clusters that could correspond to singular knapping events, and to identify the movements of pieces within the same raw material unit outside of their clusters, which could point to the use of these artefacts.

These results, together with the presence of artefacts of every phase of the *chaîne opératoire*, point to developed knapping activities carried in the settlement and the areas where they took place. A new interdisciplinary study will identify the role played by intentionally moved pieces.

1. Introduction

Generally speaking, research on the behaviour of Middle Pleistocene populations has always been secondary to the study of those from the Upper Pleistocene. In most cases, the ancient chronology of the settlements means that the assemblages left behind by these human groups are not optimally preserved (particularly with regard to faunal remains and certain lithic raw materials), which makes it impossible to develop studies as detailed as those carried out on the more recent chronologies of the Upper Pleistocene. Nevertheless, it is essential to study the skills and knowledge of *Homo heidelbergensis* and of the early representatives of the Neandertal lineage in order to infer patterns of behaviour and intra-site and inter-site mobility, just as has been done at more recent sites.

In most cases, behavioural interpretations have been based on archaeological assemblages primarily made up of objects grouped and identified by layers. However, a lack of an exact correspondence between geological time and the archaeological time formation of these assemblages continues to be a key problem (Binford, 1981; Schiffer, 1985; Vaquero et al., 2012). This problem becomes more evident with assemblages such as that of unit TD10.1 at the Gran Dolina site. Archaeostratigraphic studies have established several archaeolayers within unit TD10.1 (Obregón, 2012) because the very slow sedimentation rate and high density of faunal and lithic remains at the site make identifying occupation layers difficult. Therefore, the unit constitutes a deposit with a formation that could have covered hundreds or even thousands of years, and in which several cultural and natural processes took place (Bailey, 2007). Palimpsests are the result of several occupations, and every occupation is the result of several consecutive decisions and activities. It is for this reason that the objective of any

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behavioural study of hominids must be based on short temporal ranges, closer to singular moments within an occupation, and the temporal scale with which to make inferences about human behaviour is likely to be the 'event' (Brooks, 1982).

It is difficult to discern an individual knapping event within an assemblage, but the study of such events could represent a useful way to break away from the 'average behaviour' inferred from the general studies of palimpsests (Vaquero, 2008). In this regard, refit studies are one of the most suitable tools, not just for identifying singular events, but also for studying and contextualising them within a human occupation.

The previous refit study in the NW sector of TD10.1 (López-Ortega et al., 2011) found numerous refits and connections between artefacts, pointing to the existence of short knapping sequences and towards the possibility of obtaining more data about the identification of clusters, knapping areas and singular activity events with a broader study.

This paper presents the expansion of that initial refit study, including the entire quartz and quartzite assemblage in unit TD10.1. The aim of this analysis is to identify new connections between artefacts, to recognise the different types of connections and their positions, and to distinguish raw material units whose distribution may correspond to a knapping activity carried out in that place. Since two raw materials are analysed, we sought to identify any possible differential patterns in the location and distribution of those materials, as well as their types of refits and conjoins.

With this aim, unit TD10.1 of the Gran Dolina site represents a unique opportunity to explore the potential of this type of analysis with a large Middle Pleistocene assemblage.

2. Materials

2.1. Sierra de Atapuerca

The Sierra de Atapuerca is a small hill measuring about 25 km^2 and located approximately 15 km from the city of Burgos. The elevation of the hill ranges between 1000 and 1100 m above sea level. It is located in the Bureba corridor, about 3 km from the Arlanzón River, and is bordered by the basins of two of the largest rivers on the Iberian Peninsula: the Duero in the southwest, and Ebro in the northeast (Fig. 1).

This strategic location was fundamental to its occupation dating from the Early Pleistocene, due to the huge variety of biotopes and biodiversity in the region (García Antón, 1995; Vallverdú et al., 2001).

There are numerous archaeological sites in the Sierra de Atapuerca, spanning over approximately the past one million years, i.e. most of the Pleistocene and the beginning of the Holocene. These sites date from some of the earliest known human occupation events in Europe, and are keys to the behaviour and development of those humans on the European continent. Examples include unit TE9 of Sima del Elefante, dated at 1.2 My, and unit TD6 of Gran Dolina, dated at 0.8–0.9 My (Falguères et al., 1999; Parés and Pérez-González, 1999; Pares et al., 2006; Berger et al., 2008), both of which have yielded some of the oldest human remains in Europe.

2.2. Gran Dolina

Gran Dolina is one of the cavities located in the Trinchera del Ferrocarril (railway trench). It is filled with 18 m of sediments divided into 11 lithostratigraphic units called TD1 to TD11 from bottom to top, and with a chronology that goes from the Lower to the Middle Pleistocene (Gil and Hoyos, 1987; Pérez-González et al., 2001; Berger et al., 2008; Falguères et al., 2013; Arnold et al., 2014; Arnold and Demuro, 2015), which have been slightly revised in later works (Rodríguez et al., 2011).

The topmost of these units is TD10, a 2–3 m thick deposit made up of reddish-brown clays with limestone gravel and blocks derived from the structural degradation of the cave. TD10 has been subdivided into four major lithostratigraphic subunits (from top to bottom): TD10.1 (which has been archaeologically separated in Upper and Lower), TD10.2, TD10.3 and TD10.4 (Pérez-González et al., 2001; Mallol and Carbonell, 2008; Rodríguez et al., 2011; Ollé et al., 2013). The occupation layers are within these subunits (Fig. 2).

2.3. Unit TD10.1

Lithostratigraphic field observations show that TD10.1 is texturally very homogenous (Campaña et al., in press). It is composed of reddish-brown silty clays with scattered limestone gravel and localised beds of medium and large-sized limestone blocks that form the slope and support the hypothesis that the main entrance of the cave was at the south-western end of the excavation area.

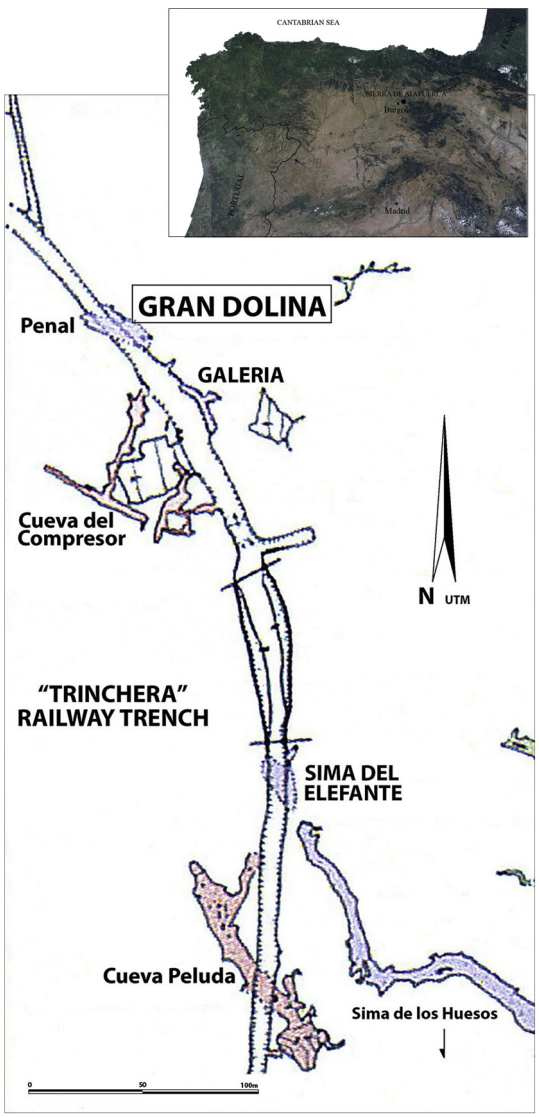

Fig. 1. *Top*: Location of the Atapuerca sites. *Bottom*: Map of the karstic system of Trinchera del Ferrocarril, and the location of the Gran Dolina site in the topmost part.

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