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Management of residues and natural resources at San Cristóbal rock-shelter: Contribution to the characterisation of chalcolithic agropastoral groups in the Iberian Peninsula

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ABSTRACT

Use of the space and settlement patterns at the deposit of San Cristóbal are characterised.

Anthropogenic activities at the site are revealed through an interdisciplinary approach based on microstratigraphic and palaeobotanical studies. Correlation of micromorphological, silica phytolith, charcoal, pollen and non-pollen palynomorph analyses and calcitic pseudomorph and faecal spherulite quantification are coupled with excavation data and macroscopic observations.

Results provide insights into livestock keeping practices at the rock-shelter, animal feeding strategies, management of residues and occupation mode of the site.

They also contribute to reconstruct the formation processes of the deposits and to outline the ecological frame of the site during its use as herding facility over the Chalcolithic.

The immediate chrono-cultural context of the investigated sequence is outlined allowing discussion on the possible role of the activities at the rock-shelter in the territorial organisation of local early agropastoral groups at the time of megalithism development.

From a methodological point of view this work shows that high-resolution sedimentary contextualisation of archaeological remains is essential to build up more accurate and reliable interpretations on livestock management and the use of natural resources in prehistoric deposits.

It also highlights the contribution of excavation strategies adapted to the particularities of pen deposits to better understand the archaeological evidence of early pastoral practices in cave and rock-shelters during fieldwork.

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1. Introduction

The prehistoric use of caves and rock-shelters as herding facilities was first identified in the mediterranean region through geoarchaeological analyses in the early 80s of the last century (Beeching and Moulin, 1983; Brochier, 1983a, 1983b, 1984).

The areas within the sites where the animals were kept consist to a great extent of a variable mixture of plant and animal litter, which is preserved in the stratigraphic record in the form of mineralised residues that commonly include an assortment of combusted remains (Angelucci et al., 2009 and references therein; Polo-Díaz, 2010).

Application of high-resolution techniques, especially those involving geoarchaeological and palaeobotanical protocols has proven its suitability to address challenges regarding the interpretation of cave and rock-shelter herding facilities.

Thin section analyses have made it possible the study of the sedimentary context of those sites in the Iberian Peninsula and the

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identification of dung deposits with evidence of thermal alteration from the Neolithic (Bergadà, 1997, 2001; Bergadà et al., 2005a; Verdasco, 2001; Polo-Díaz, 2010; Lancelotti et al., 2014). Specific microstratigraphic features discovered in such residues through microscopic analysis demonstrate intentional management of waste materials consistently over time from the Neolithic (Polo-Díaz, 2010). High-resolution geoarchaeological techniques have also allowed characterisation of taphonomic dynamics affecting pen deposits in the region (Polo-Díaz and Fernández Eraso, 2010a; Polo et al., 2014).

Palaeobotanical investigations applied to Iberian agropastoral sites have provided much relevant information regarding landscape configuration and vegetal resources available for animal management by early farming groups (Badal, 1999; Ejarque et al., 2010; Badal et al., 2012; Perez-Díaz et al., 2015). In addition, high-resolution analyses of coprolites from archaeological and ethnographic materials have contributed direct data concerning flock feeding patterns (Badal and Atienza, 2005, 2008, 2009).

Since, geoarchaeological and palaeobotanical studies are able to yield on their own high-quality information to improve our understanding of prehistoric animal management and related practices, it seems reasonable to expect the integration of both methodologies to significantly boost our knowledge on those issues.

At the same time, correlation of geoarchaeological and palaeobotanical proxies can introduce relevant advances in the reconstruction of the relationships between human activities and natural resources of early agropastoral communities by allowing more detailed and accurate interpretations on the formation processes of the archaeological records.

However and despite the potential of such approach, its application, particularly to cave and rock-shelter deposits of the Iberian Peninsula, is still lacking.

In this scenario the objectives of this work are:

- To appraise the contribution of microstratigraphy, palaeobotanical analysis and fieldwork data to the understanding of early pastoral sites.
- To define the use of the space and human activities involved in the formation processes of the chalcolithic sediments at the site;
- To clarify the occupation pattern of the rock-shelter and its implications in terms of natural resource exploitation and local territorial organisation of early agropastoral communities.
- To assess the preservation degree and the integrity of the archaeological record.

2. San Cristóbal rock-shelter: site, stratigraphy, chronology and cultural frame of the chalcolithic sequence

2.1. Site location

The site of San Cristóbal is located on the south side of the Sierra de Cantabria (Rioja Alavesa), a medium-size mountain range sitting at the southern limit of the Basque-Cantabrian Basin and closing up the Ebro Valley at its uppermost part (Martínez Torres, 1984).

The archaeological deposit is situated within a Cretaceous limestone rock-shelter at 920 m above sea level, on a hillside overlooking the ravine of San Cristóbal, which is placed between Fonsagrada, where a maximum height of 950 m is reached, and the lower escarpment of the Sierra de Cantabria, in the area known as Los Castillos (30. ETRS 89 UTM X = 531,844; Y = 4716246) (Fig. 1 a, b).

The morphology of the rock-shelter, which roof is currently partly collapsed on its south area, presents a dome shape, 4 m at its highest point, 11.75 m from east to west and 6 m from north to south.

2.2. Stratigraphy, chronology and artefact assemblage

The archaeological excavation at the site took place between 2007 and 2015, unearthing a total of 13 prehistoric levels within an excavation area of 9 m² (Fig. 1 c). Radiocarbon dates currently available provide a chronological frame for the archaeological record spanning from the Middle Neolithic through to the Bronze Age.

From the late XV century the structure of the rock-shelter was used as part of a hermitage construction. During this period several pits were dug within the site, which affected the underlying prehistoric sequence. However, and despite the partial stratigraphic disturbance, significant areas of the prehistoric deposits retain an exceptional state of preservation.

Seven archaeological levels were individualised as part of the chalcolithic sequence (Fig. 2), which covers a temporal span of 500 years (Fig. 3).

From a sedimentary point of view the chalcolithic deposits of San Cristóbal are characterised by alternating whitish/light grey, blackish and brownish clayey silty layers that follow a reiterative pattern (Fig. 2). Whitish layers present variable thickness ranging from 1 to 20 cm. In contrast, the underlying blackish layers show a more regular pattern with thickness consistently between 1 and 3 cm. Brownish layers are between 5 and 7 cm thick. The coarse fraction is scarce especially in the whitish layers where subrounded limestone fragments are only occasionally documented. Detrital input is more abundant in the brownish layers where the size of the clasts is also larger. This sedimentary pattern continues further down the profile where neolithic levels, currently under investigation, have also been detected.

The main characteristics of the chalcolithic levels studied are summarised below:

2.2.1. Level II

This accumulation consists of a light grey (10 YR 7/2), clayey silty, 10–12 cm thick lense including small fragments of charcoal and subrounded-rounded limestone gravels. Four postholes 6–9 cm in diameter and 10–12 cm deep were detected in this layer. Seventy eight potsherds, most of them with no decoration, fifty six flint fragments including flakes and blades, a hand mill and a polished pebble were recovered (Fig. 4 a).

2.2.2. Level III

This level is made of brownish (10 YR 4/3) – dark brown (7.5 YR 3/2) sediment including abundant greyish (2.5Y 4/1) patches. The texture is clayey silty and the thickness is between 14 and 20 cm.

A hundred and fifty three pottery sherds were recovered from this level of which fourteen correspond to the Bell Beaker (ciem-pozuelos style) type (Fig. 4 b).

Forty two flint fragments including flakes, blades and fragments without recognisable typological ascription were documented.

2.2.3. Level IV

This deposit consists of a whitish clayey silty layer of up to 20 cm thick. The thickness of the accumulation was very irregular when excavated in extension, although a tendency to lateral wedging was observed. Nine postholes with variable sizes, which arrangement followed the brow of the rock-shelter, were detected in this level. Two different techniques were identified in the setting of the

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