



## Research Article

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# The Use of Rock Shelters During the Early Neolithic in the North of Alicante (Spain). The Site of Peña Roja de Catamarruc (Alicante, Spain) as a Case Study

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**Abstract:** The first Neolithic communities settled in the East of the Iberian Peninsula developed a complex strategy of land occupation. These strategies evolved as their social, demographic, and economic bases were transformed. In this paper, we focus on the analysis of archaeological sites located under rock shelters, which were recurrently occupied throughout the Early Neolithic. To deepen this analysis, we reviewed the archaeological record of Peña Roja de Catamarruc (Planes, Alicante), as well as other sites of similar characteristics. This information, combined with different spatial analyses – prominence, visibility, and capacity of use of the soils – allowed us to define a series of patterns of occupation and exploitation of the territory of the first Neolithic communities. This study highlights the importance of the forest as a resource related not only to hunting and gathering as traditionally seen, but also to shepherding.

**Keywords:** Early Neolithic, rock shelters, shepherding, territorial mobility, landscape

## 1 Introduction

Human mobility across territories has been constant throughout the species' history, allowing them to occupy all inhabitable regions of the planet. Often, the occupation of new spaces involved adapting to new ecological conditions. This was enabled by the enormous capacity for adaptation of humans, who can transform and adapt their ways of life to continuously changing environments. One of the best analysed transformation processes is that associated to the Neolithic expansion beyond the early adoption foci. Such expansion and subsequent consolidation of the Neolithic way of life on the European continent shows processes of adjustment and transformation of the economic bases and, consequently, of territorial behaviour (Guilaine, 2000), social relations, and even the ideological universe.

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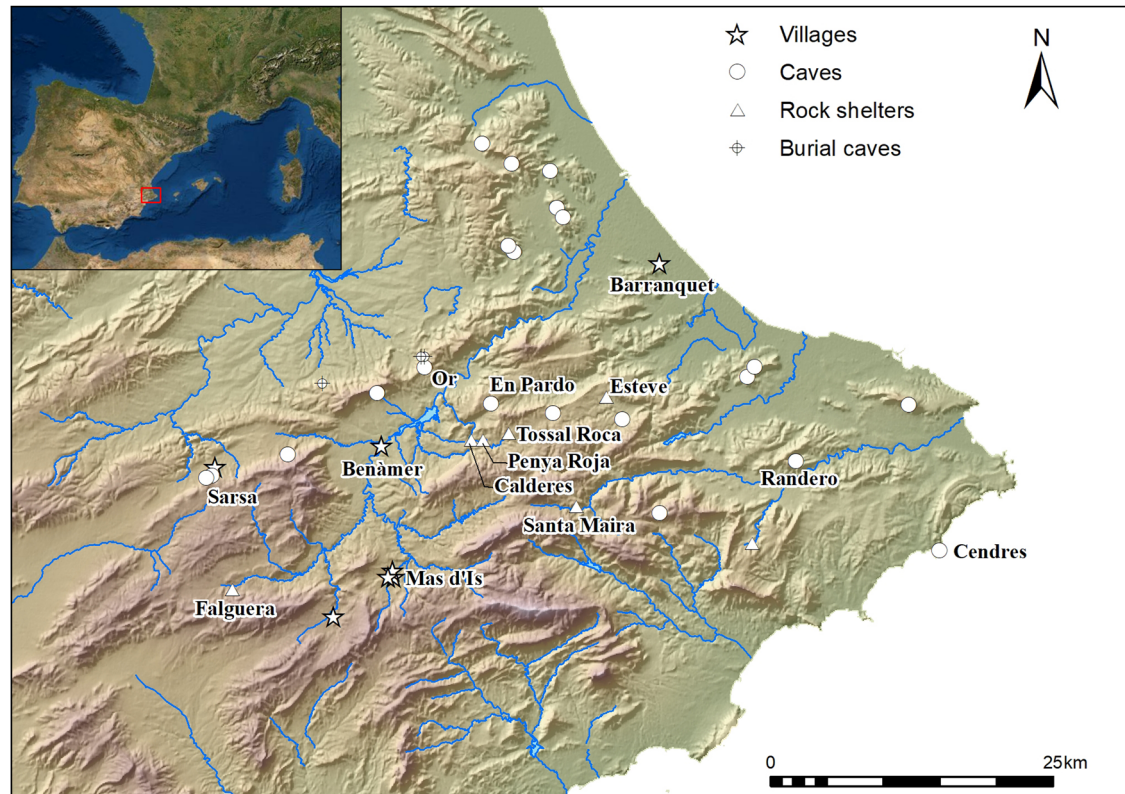
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**Figure 1:** Location of main sites mentioned in the text.

Neolithic communities of the Mediterranean area, which include the groups of pioneers who settled in the Valencian area around 5600 BC from different regions of the central and western Mediterranean (Bernabeu, Molina, Esquembre, Ramón, & Boronat, 2009; García Atiénzar, 2010), were characterised by an economic system based on cereal agriculture and shepherding. Excavations carried out in the region, as well as the wide range of radiocarbon dating, have shown the existence of a large network of settlements from the second half of the 6th millennium BC (García Puchol *et al.*, 2018). Although this was a phenomenon of coastal expansion, the archaeological record shows that there was a rapid advance towards the interior. Therefore, within a few generations, evidence of the farming way of life can be identified both on the coast and in inland valleys, some of which are over 50 km from the sea (Figure 1).

The first villages were in plain areas, near riverbeds, exploiting well-irrigated and fertile soils. Evidence founded from sites like Mas d'Is or Benàmer show the existence of villages made up of scattered domestic units, sometimes linked to huts built with ephemeral materials, combustion structures, and areas of activity (Jover, Pastor, & Torregrosa, 2019). One example is Mas d'Is, which exhibited large ditches that served a range of potential functions (Bernabeu, Orozco, Díez, Gómez, & Molina, 2003).

At the same time, mountainous cavities surrounding these valleys were also occupied. Their morphological features, as well as their archaeological record, have raised the possibility that caves may have been permanently inhabited, as seen in Cova de l'Or, although the possibility of other types of use remains plausible (Martí, 2008). Other caves, located both on the coast and in the Serpis valley, as well as in the natural corridors that connect both areas, might have acted as temporary refuges associated with different activities such as shepherding, mollusc gathering, hunting, etc. (Bernabeu & Molina, 2009a; García Atiénzar, 2009; García Puchol & Aura, 2006). In some instances, caves were used as burial sites (Bernabeu, Molina, & García, 2001; García Borja, Salazar-García, Aura, Cortell, & Velasco, 2016). Such use lasted over time, generating a palimpsest that makes it difficult to assess their ritual importance during the Early Neolithic.

Sites associated to farming way of life are located near the river Serpis and adjacent valleys to the seacoast. Nevertheless, between these two areas there is a rugged landscape dominated by mountain

ranges and narrow valleys, conforming unsuitable territories for agriculture suitability. It is precisely in this region that the greatest amount of evidence related to the Early Neolithic has been documented (García Atiénzar, 2009), mostly related to the use of caves or rock shelters. The few excavations carried out in these contexts show that these are specialised occupations, generally related to a combustion structure around which different activities were performed. One of the best-known cases is Cova d'en Pardo, characterised by an area of activity associated with hunting and dated to around 5600 BC (Soler, Gómez, García, & Roca de Togores, 2011; Soler et al., 2013). More recently, similar examples have been reported, such as Cova del Randero (Soler, Gómez, & Roca de Togores, 2014), dated towards the end of the 6th millennium BC.

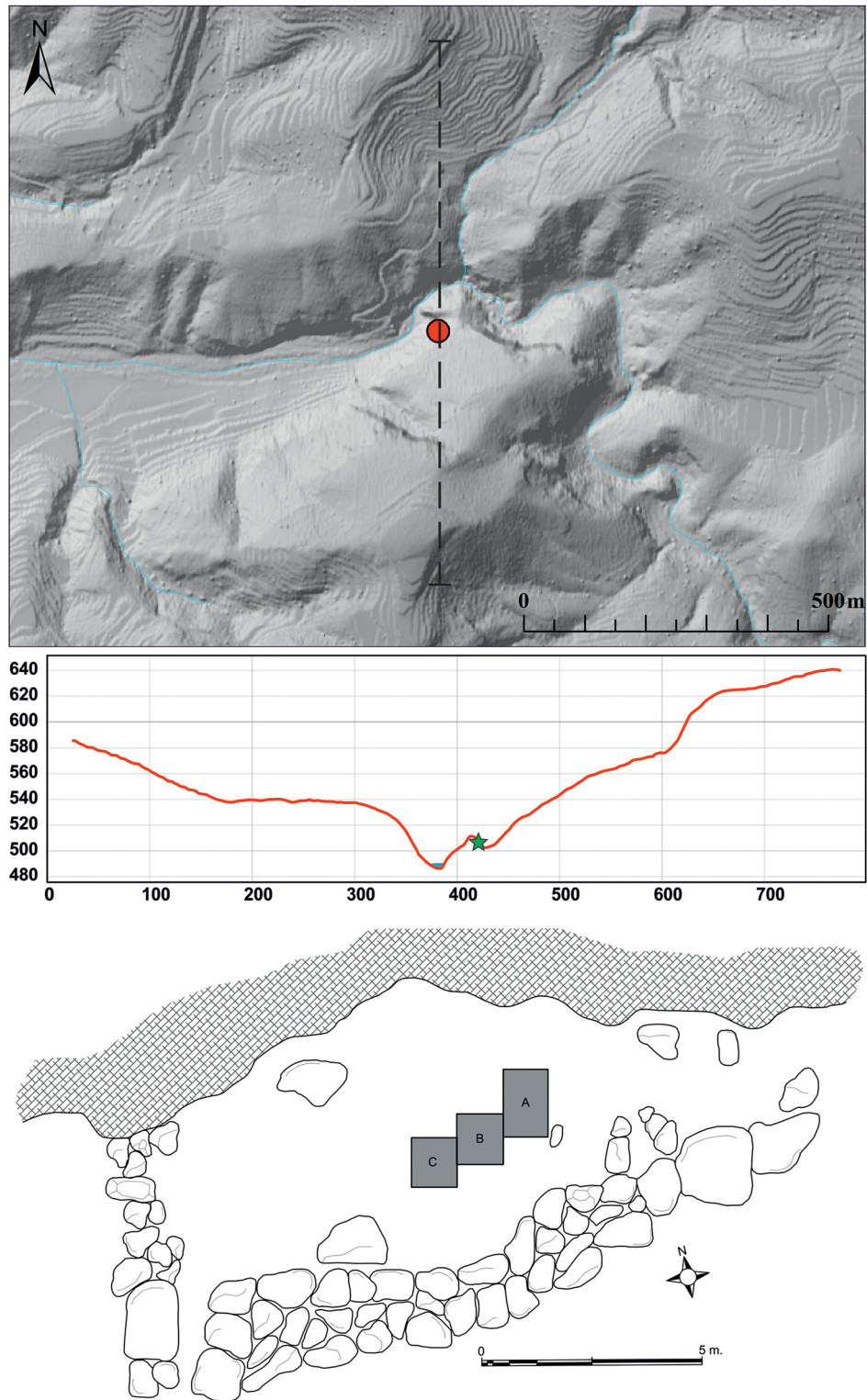
In this paper, we will focus on sites located in rock shelters. Despite the considerable amount of evidence, the available information is limited by the poor preservation of the stratigraphic series, due to the sites' morphological characteristics and their exposure to atmospheric agents. Furthermore, these shelters have been occupied from the Early Holocene to recent times for livestock and hunting purposes, thus altering the archaeological deposits. These settlements are in corridors – Vall de Gallinera, Vall d'Alcalà, Vall de Seta, etc. – that connect the upper Serpis valley with the coastal plain and the inland valleys. One of the best-known examples is Abric de la Falguera, located at the source of the river Serpis (García Puchol & Aura, 2006). Evidence from phase VI shows that it was sporadically but repeatedly used, in association with the exploitation of the surrounding landscape, especially for sheep grazing. Microsedimentological analyses confirmed its pastoral use since the Early Neolithic, although this was unlikely to be the only activity developed. The observed structures – pits and fireplaces – the abundant and varied archaeological material, as well as carpological remains relate it to the storage of food (García Puchol & Aura, 2006). Other shelters have also been excavated, such as Abric del Barranc de les Calderes and Coves d'Esteve (Doménech, 1990), Abric del Tossal de la Roca (Cacho et al., 1995), or Coves de Santa Maira (Aura et al., 2000; Verdasco, 2001), but these studies focused on Palaeolithic or Mesolithic occupations. In the next lines, we will consider *Penya Roja de Catamarruc*, a site whose materials refer exclusively to Neolithic occupations (Asquerino, 1972), as a case study.

## 2 *Penya Roja de Catamarruc*: Location, Archaeological Actions, and Material Culture

*Penya Roja de Catamarruc* shelter is situated on the Northern slope of the Les Calderes ravine, in the northern foothills of the Cantacuc mountain range. This is a strategic location with easy access to the Encantà ravine, which connects with the middle valley of the river Serpis, and also with the valleys of Gallinera and Alcalà, natural corridors from the interior towards the coast. The site is located under a rocky wall about 50 m high and 150 m long, forming a natural shelter facing north. Today, the shelter is delimited by an artificial wall built by contemporaneous shepherds.

Several excavations were carried out at the site, the first one in 1970 by E. Faus. However, the only systematic intervention was conducted under the direction of M<sup>a</sup>.D. Asquerino during the month of June 1971 (Asquerino, 1972). The task consisted of two 1 sq m soundings and a third one of 1.5 m × 1 m (Figure 2), using artificial layers of 10 cm. Three stratigraphic levels were identified. The first, about 30 cm thick, offered the largest number of objects; the second, about 15 cm thick, was characterised by an abundant presence of ashes and small coals; and the last, also about 15 cm thick, was sterile. Later, members of the Centre d'Estudis Contestans recovered archaeological materials, some of which match those documented by Asquerino.

The ceramic set, which includes the materials conserved in the Archaeological Museum of Alcoy, from Asquerino's excavations, and those conserved in the Centre d'Estudis Contestans, consists of 141 fragments of which 31 (22%) provide morphological and/or decorative information, while 110 (78%) are uninformative. The method of analysis we have used is based on the initial proposal of Bernabeu (1989) which has been applied in contemporary contexts such as Cova de les Cendres (Bernabeu & Molina, 2009b), Cova de l'Or (García Borja, Cortell, Pardo-Gordó, & Pérez-Jordà, 2011), Cova d'en Pardo (Soler et al., 2011), Cova de la Sarsa (García Borja, 2017), and Los Limoneros (Martínez Amorós, 2017). Among the formal fragments, eight



**Figure 2:** Location of Peña Roja de Catamarruc, topographic profile, and planimetry of the shelter with indication of Asquerino's soundings.

rims were identified, four of them straight, two open, and one closed. The lips are mostly rounded ( $n = 6$ ), but one pointed lip and one straight lip were recorded. The appliqués consist of seven fragments: four cords, one ribbon handle, one ring handle, and one tongue.

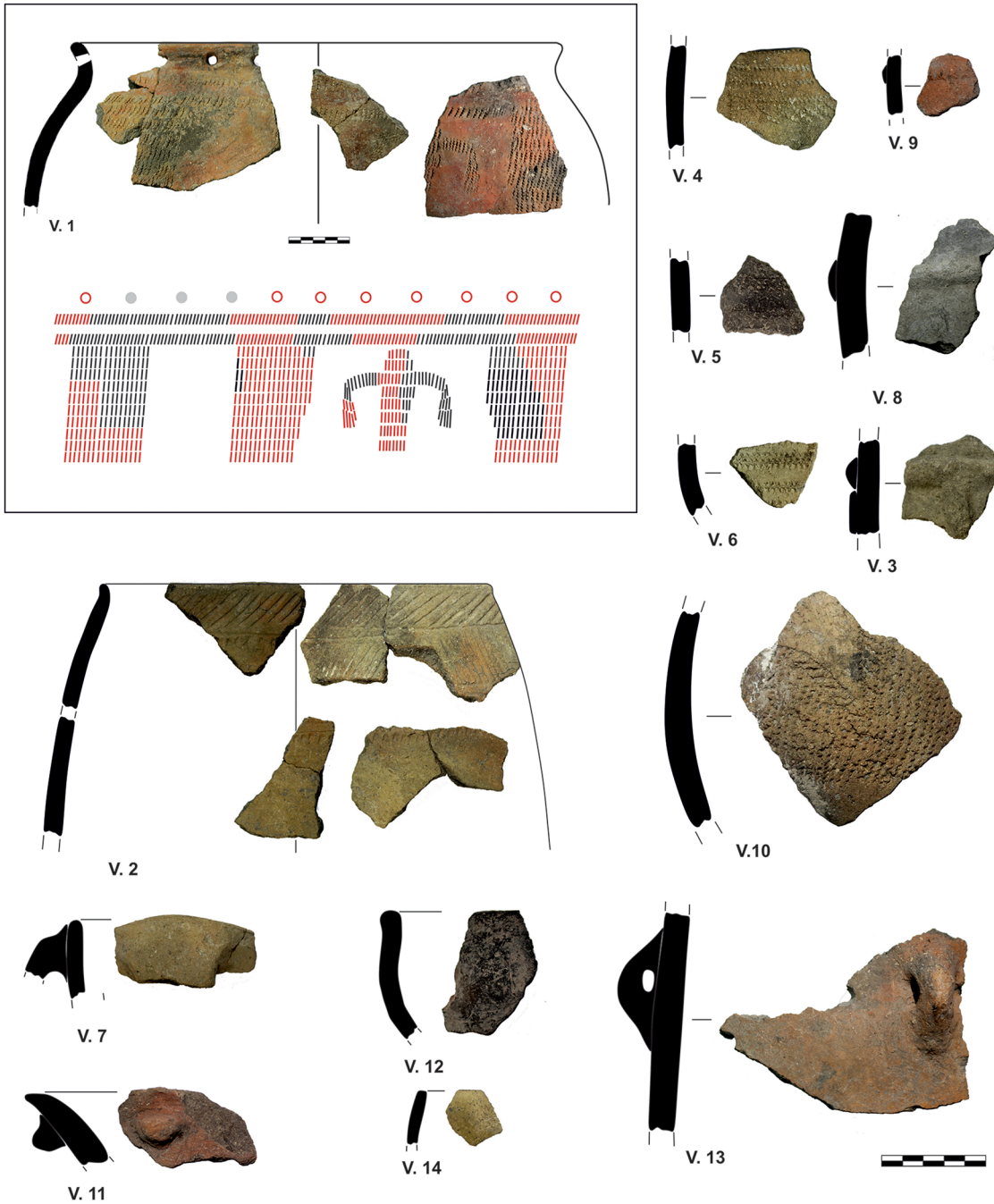


Figure 3: Individualised vessels from Peña Roja de Catamarruc.

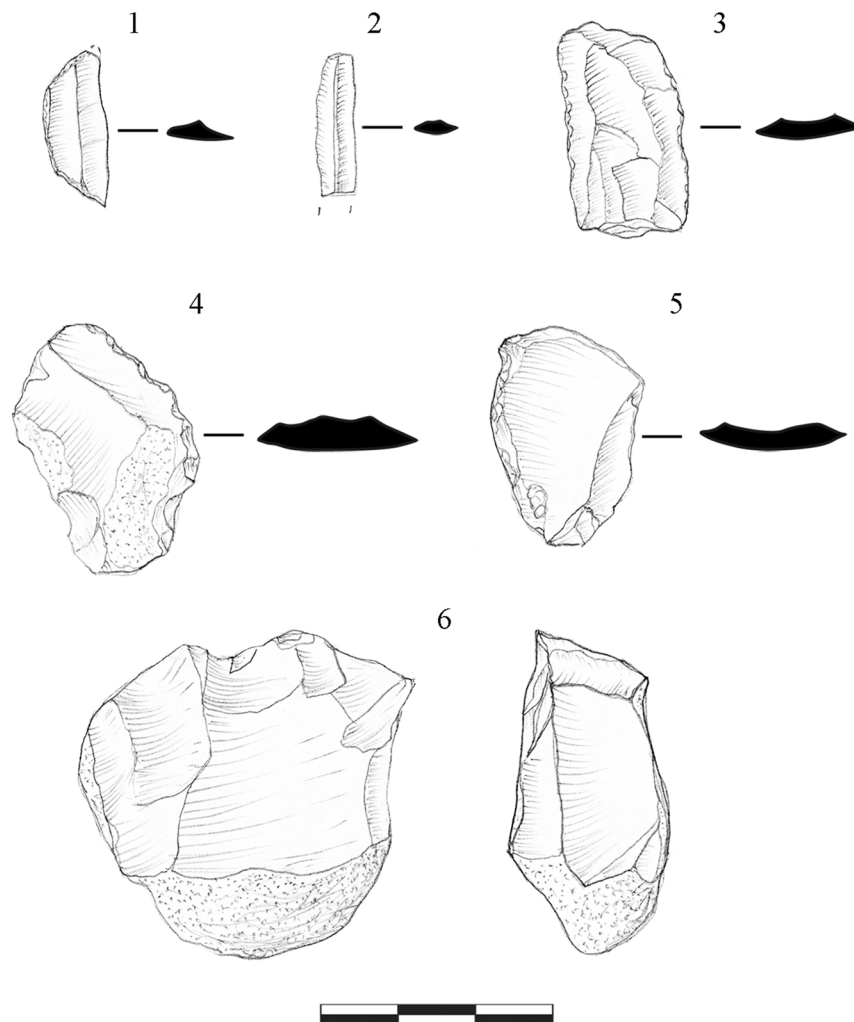
The study of ceramic fragments and the reconstruction of vessels identified a total of 14 vessels from 45 fragments, by means of the minimum number of individuals method and considering decorative, morphological, and technological characteristics (Figure 3). The profile analysis shows a large-sized globular container (vessel 1), an ellipsoidal pot (vessel 2), and four medium and small-sized semi-spherical vessels that resemble a plate (vessel 11) and bowls (vessels 7, 12 and 14).

A total of 26 ceramic fragments are decorated, mostly showing cardial impressions (11 fragments of vessels 1, 4, 5, 6, and 10). The decorations are characterised by the presence of horizontal bands alternating with undecorated stripes, composition defined as “zoned Cardial” (Manen, 2002). In some cases, these compositions are bordered by bands filled with short strokes made with a shell edge (vessels 4 and 5). Vessel

1 displays a possible figurative motif framed between vertical and horizontal bands of cardinal impressions (Figure 3). The motif depicts an anthropomorphic T-shaped figure, showing part of the body and a complete left arm in one fragment and part of the right arm in another. Vessels with this type of figurative scenes were argued to be found in sanctuaries or spaces of social aggregation (Martí & Hernández, 1988). However, their presence in other contexts used as seasonal shelters or as pen – such as the Abric de la Falguera – leads to reconsideration of the symbolic value of this type of vessel. In fact, Bradley (2005) already stressed the impossibility of separating the symbolic sphere from the domestic sphere in many of the prehistoric societies. Vessel 9 has a ribbon decorated with instrument impressions, and Vessel 2 has incised and impressed decoration formed by two bands filled with oblique incisions alternating with rounded-point instrument impressions. Finally, applied decorations (4 fragments; vessel 3) are defined by smooth ribbons.

Regarding technology, all vessels' surfaces are smooth. Irregular firings are the most prevalent (57%), followed by reduction firings (43%). Most fragments show erosion and concretions on their surfaces, and, in some cases, they have lost part of the surface, especially the inner one. Medium and large-sized particles of quartzite and limestone are the main inclusions recorded. In terms of thickness, thin-walled fragments are the least frequent (21%), while fragments with medium walls accounted for 36% and thick-walled fragments – between 9 and 16 mm – accounted for 43%. The higher percentage of thick-walled vessels confirms the presence of large containers.

The lithic set is made up of knapped ( $n = 52$ ) and macro-lithic pieces ( $n = 2$ ). The knapped lithic industry (Figure 4) could be defined as a predominantly flake production (25%), although several laminar products were also recovered (17%). Flakes present different typologies, being larger than the blades, with some



**Figure 4:** Knapped stone products from Peña Roja de Catamarruc (1) Geometric microlith – segment; (2 and 3) Blades; (4 and 5) Retouched flakes; (6) Core.

of them showing cortex. Laminar production is made up of both blades ( $n = 6$ ) and bladelets ( $n = 3$ ). All blades have proximal fractures, except one with a mesial fracture. They have a triangular section, although two exhibit trapezoidal section. Of the three bladelets, only one is complete, while the other two show distal fracture. Like the larger ones, they have triangular sections, except for one. The presence of retouched tools is limited to several flakes with a denticulate (Figure 4(4)) and a geometric microlith – circle segment with abrupt retouching (Figure 4(1)). The set also includes a large quantity of debris, 54%, and three cores of flakes and blades at different stages of exploitation (Figure 4(6)). These characteristics are comparable to those documented in Neolithic contexts in the area (García Puchol, 2005; Juan-Cabanilles, 2009).

Both the flakes and the knapping remains show different degrees of heat alteration on the surface. Some extractions preserve cortex from the primary nodules, which is evidence of first generation and later debitage. In the same way, we can see numerous pieces derived from the preparation of the surfaces of the cores that conform the necessary supports for the creation of different tools. As an example of this process, we can see a piece that has cortex in its distal area and three laminar negatives on its obverse, with a possible frustrated extraction of the blade.

The flint recovered is always in shades of brown, from greyish to yellowish, associated with the Serreta type, and greyish white, which can be related to the Catamarruc type (Molina, 2016), both lithologies being present in the immediate surroundings.

The presence of cores, the large number of debris, as well as different alterations, in addition to the scarcity of tools, could be indicative of the functionality of the site with short stays during which knapping activities would be carried out.

The recovered macro-lithic tools consist of a possible roughed tool on limestone without clear signs of use and a hammer fragment, also on limestone, with clear signs of use. Although scarce, these pieces reveal the use of elements of greater size and weight to carry out other activities, such as the processing of plant-based foods, related to the punctual use of the shelter.

Three ornaments were also recovered: an oval pendant on a polished shell with a slight central depression, a *Columbella rustica*, and a freshwater mollusc – *Melanopsis* sp., – the last two perforated. Oval shell pendants with a bulging base have been found in Early Neolithic caves such as Or, Cendres, Sarsa, or En Pardo. Perforated *Columbella rustica* are also common in ancient Neolithic sites, being widely present for this chronology in the entire western Mediterranean (Pascual, 1998).

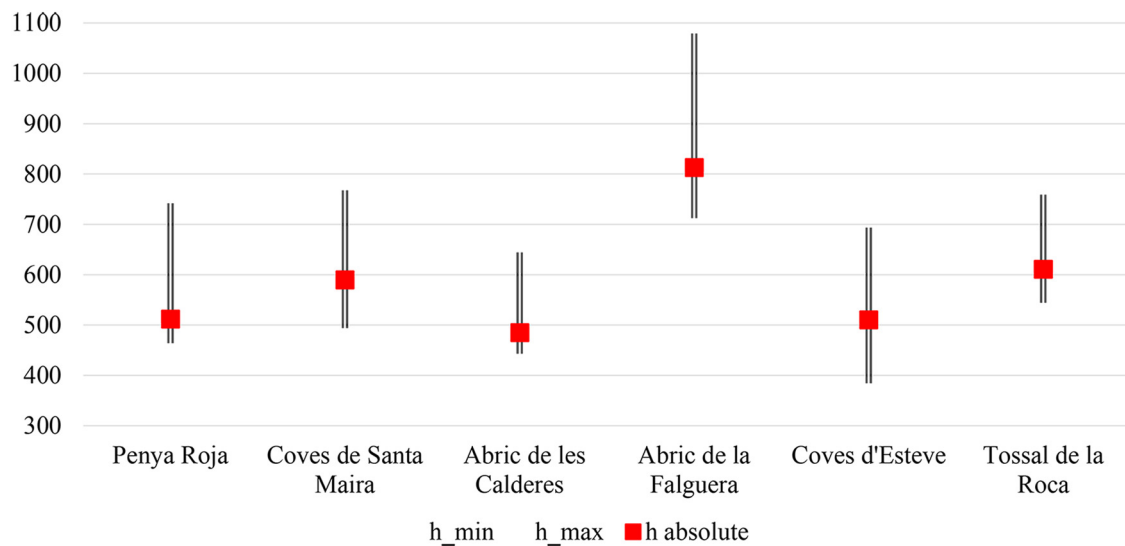
Finally, the faunal remains, although scarce and very altered by different post-burial processes, show the presence of ungulates and bovines, as well as rabbits.

The material evidence, especially the pottery, allows us to propose at least two occupations associated with different Neolithic moments, despite the unclear distinction derived from the stratigraphy defined by Asquerino. The first period is characterised by cardial decorations dated from the second half of the 6th millennium BC – ca. 5500–5200 cal BC (Cardial Neolithic) – and the later occupation dated between the end of the 6th and the beginning of the 5th millennium cal BC – ca. 5200–4800 cal BC (Epicardial Neolithic) – characterised by incised-impressed decorations. However, the lack of a chronological definition of the remaining evidence and the lack of a clear stratigraphy do not allow us to confidently define duration, or characteristics of these occupations.

The same occupation pattern can be seen in other sites in the area, transitioning from cardial pottery to fragments with sgraffito decoration, characteristic of the second half of the 5th millennium BC. These rock shelters, in addition to a chronology like that of Peña Roja, have features comparable in terms of their location in the natural corridors which connect the Serpis valley with the Mediterranean coast or in terms of their archaeological register (García Atiénzar, 2004, pp. 144–148).

**Table 1:** Prominence and viewshed analysis from rock shelters with Early Neolithic occupations

Site	Prominence analysis					Viewshed analysis			
	<i>h</i> absolute	<i>h</i> 1,000 m (mean)	<i>h</i> 1,000 m (median)	<i>h</i> <sub>min</sub>	<i>h</i> <sub>max</sub>	Difference ( <i>h</i> – <i>h</i> mean)	Orientation	Visual range	Viewshed surface (sq m)
Penya Roja	512	570.9	569.2	470.5	735.6	–58.9	W	Partial	479,990
Coves de Santa Maira	590	640.3	642.6	500.2	761.4	–50.3	SE	Sectorial	4,013,743
Abric de les Calderes	485	529.6	528.3	449.2	638.3	–44.6	W–SW	Partial	388,943
Abric de la Falguera	813	840.3	827.3	718.6	1072.9	–27.3	NW	Sectorial	1,053,898
Coves d’Esteve	510	510.3	510.9	390.6	687.7	–0.3	S	Extended	11,125,723
Tossal de la Roca	611	641.5	643.0	550.7	752.9	–30.5	S–SW	Sectorial	652,545

**Figure 5:** Graphical representation of prominence analyses.

### 3 Frequentation and Use of Rock Shelters: Spatial and Geostatistical Analysis

Spatial and geostatistical analyses<sup>1</sup> in Archaeology aim to provide a better understanding of the use that past societies made of their immediate surroundings and of the underlying decisions related to the selection of certain sites. In this paper, these analyses complement the available archaeological information, which is limited by the context of the site, enabling us to delve into the patterns of occupation and exploitation of the landscape more confidently.

Prominence analysis (Llobera, 2001) compares the absolute height of a point with the average and median height of the immediate surroundings – 1,000 m. This revealed that all shelters are always below the average of their surroundings, being in the lower part of relatively narrow ravines (Table 1 and Figure 5).

<sup>1</sup> Spatial analyses have been carried out using different algorithms integrated in QGIS 3.10 software.



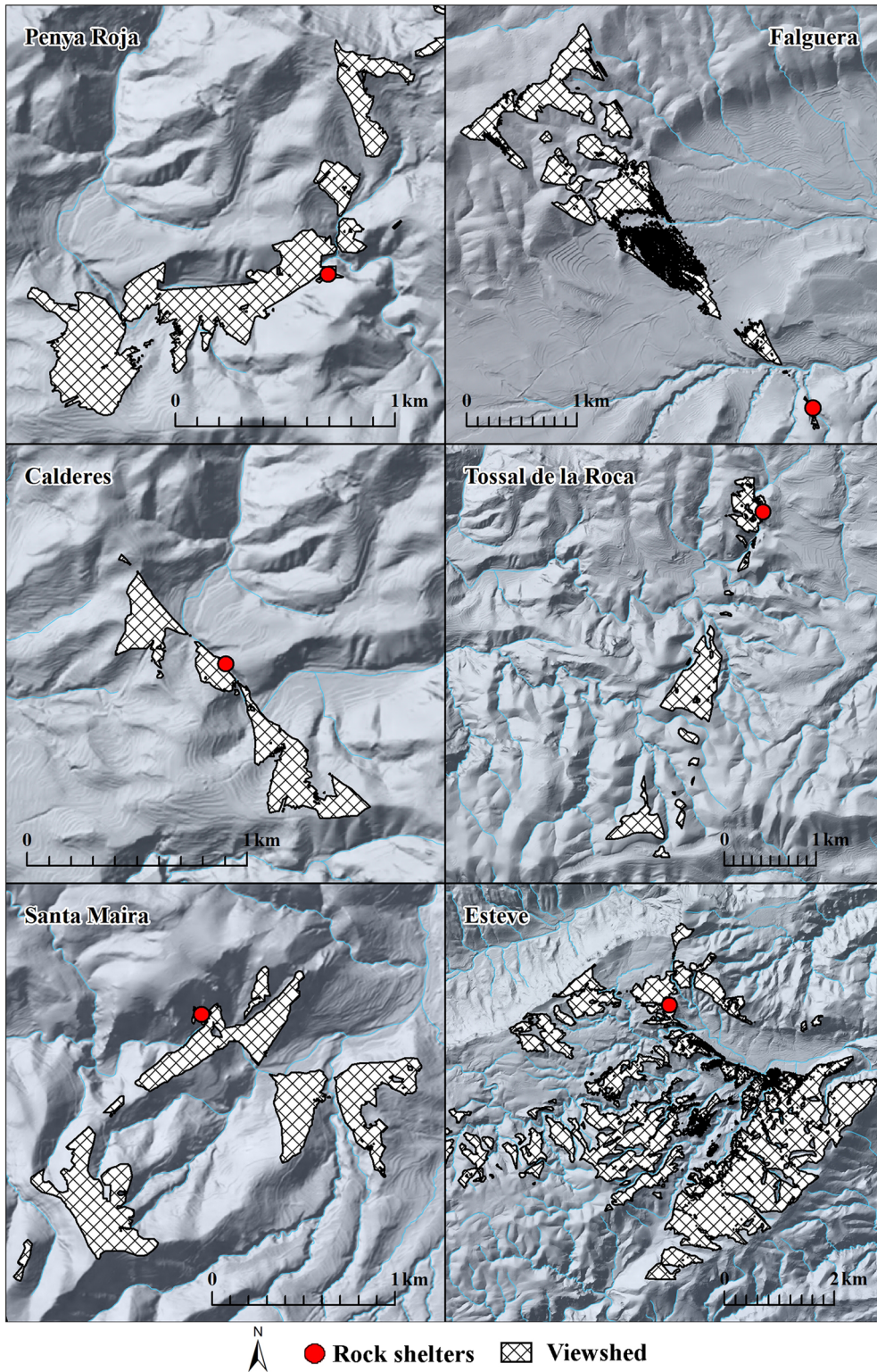
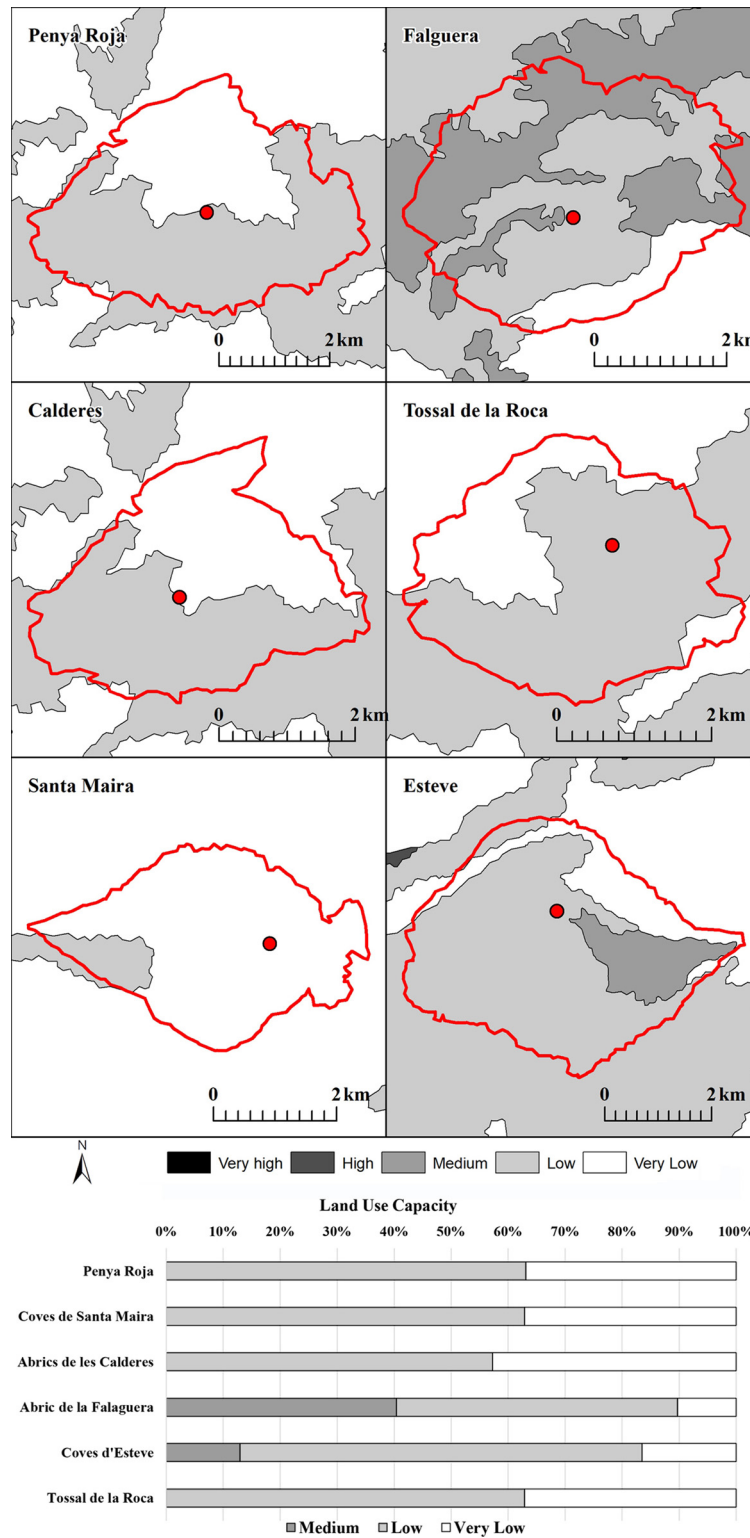


Figure 6: Viewshed analysis.

This position would ensure direct access to water and pasture, making these enclaves suitable for shepherding, as supported by the faunistic record of Abric de la Falguera, dominated by milk teeth and newborn remains of sheep (Pérez Ripoll, 2006, p. 130).



**Figure 7:** Site catchment analysis and land use capacity.

Viewshed analyses of the environment at medium distance – 5,000 m – (Kvamme, 1999) show variable orientation, always towards the nearest water courses. The visual field of the shelters is limited to the most immediate surroundings, with the main exception of Coves d’Esteve, which has an extended visual range.

The visual fields obtained can be sectorial, with a range of less than 45°, or partial, when visibility is restricted to certain areas (Table 1 and Figure 6). These characteristics show an interest in controlling the most immediate resources, fundamentally pastures and water, and not so much in movement throughout the territory.

The capacity of use of soils associated with the catchment areas (Higgs et al., 1970; Hunt, 1992) is related to forest soils located on abrupt slopes or at the bottom of small ravines (Figure 7). Their edaphological characteristics, as well as their remoteness from well-irrigated and fertile soils and permanent water courses, make these environments unsuitable for the development of agriculture.

## 4 Discussion

The faunistic, anthracological, and micromorphological evidences recovered in some of these shelters (Molina, Carrión, & Pérez-Ripoll, 2006; Verdasco, 2001) suggest occupation between mid-spring and early summer. In this sense, Falguera's highly fragmented faunistic record has been related to the intensive use of the shelter as a sheepfold (Pérez Ripoll, 2006, p. 134). These places could also be associated to the hunting of wild animals. However, the limited visual control of the surroundings from the shelters makes it unlikely for them to be considered as specialised hunting and wild herd control posts.

With these data, we believe that this type of sites could have been part of a complex strategy of occupation and exploitation of the biotic possibilities of the territory. These occupations would have been sporadic and seasonal, although not necessarily repeated in a cyclical manner. Although the exact duration of these occupations is difficult to determine, it was likely to be of several days, judging by the presence of vessels of certain storage capacity, as well as the evidence of lithic knapping activity. This would be in accordance with the practice of transterminance in which a group of shepherds belonging to a larger community settled in the villages at the bottom of the valleys, moving the flocks of sheep and goats to the mountainous areas in search of pasture (García Atiénzar, 2006, 2011).

This network of sites reveals that farming communities maximised the economic possibilities of their territory since the Early Neolithic. These shepherds developed a mobility strategy throughout the territory, combining these activities with agriculture, which would have taken place in the surroundings of villages at the valley bottoms and near fertile soils, according to palynological analyses (López-Sáez, Pérez, & Alba, 2011). This would be a flexible and extensive model of territory exploitation which would involve the displacement of the domestic unit (or part of it), generating a secondary occupation depending on the agricultural cycle.

This is an unstructured and unsystematic model, with prolonged absences that would deem conditioning and cleaning tasks unnecessary. This is observed during the 5th millennium BC, when the occupation of caves and shelters as sheepfolds for livestock intensified, displaying characteristic corral fires or *fumiers* associated to the hygienisation of the remains of livestock (Badal & Atienza, 2008; Badal, 1999). This practice is not exclusive to the eastern part of the Iberian Peninsula, but it has also been reported in other Neolithic Mediterranean sites such as Kitsos in Greece, Pupućina Cave in Croatia, Grotta de l'Uzzo or Arene Candide in Italy, and Fontbrégua, Font Juvénal, Baume Ronze, or St. Marcel d'Ardèche in France (Brochier, 1991; Brochier, Villa, & Giacomarra, 1992; Miracle, 2006).

While this model of economic management of the territory was being built, these same communities developed strategies of symbolic occupation of the landscape evidenced by rock art present in shelters located in these same valleys and ravines. The management of a large territory by scattered groups with low demographics could explain the presence of sanctuaries of macro-schematic and schematic rock art or the decorations with a symbolic character of the ceramic vessels (Martí & Hernández, 1988) which could have functioned as elements of internal cohesion.

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