

# THE INTRODUCTION OF THE FIRST FARMING COMMUNITIES IN THE WESTERN MEDITERRANEAN: THE VALENCIAN REGION IN SPAIN AS EXAMPLE

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**ABSTRACT.** *The process of neolithisation of the Mediterranean face of the Iberian Peninsula has traditionally been associated with the Cardial paradigm of the Franco-Iberian region. However, better knowledge of the material record from the arc of the north-western Mediterranean, the revision of various archaeological sites of the central Valencian region, Spain and observation of the patterns of occupation and exploitation of territory in the western Mediterranean allow us to propose a process of Neolithic introduction more complex than considered until now, that can be linked with the phase of Mediterranean impressed pottery.*

**KEYWORDS.** *Neolithic, impressed pottery, patterns of occupation, landscape, Mediterranean.*

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**TÍTULO.** *La introducción de las primeras comunidades agrícolas en el Mediterráneo occidental: la región valenciana en España como ejemplo.*

**RESUMEN.** *El proceso de neolitización en la fachada oriental de la Península Ibérica se ha asociado tradicionalmente con el paradigma cardial francoibérico. Sin embargo, el mayor conocimiento del registro material del arco nororiental del Mediterráneo, la revisión de varios yacimientos de la región central valenciana (España) y el análisis de los patrones de ocupación y explotación del territorio en el Mediterráneo occidental, permiten proponer un proceso de implantación neolítica mucho más complejo del considerado hasta ahora, que se puede vincular con el horizonte de la cerámica impresa mediterránea.*

**PALABRAS CLAVE.** *Neolítico, cerámica impresa, patrones de ocupación, paisaje, mediterráneo.*

## INTRODUCTION

EXPLANATIONS FOR THE APPEARANCE OF THE FIRST FARMING groups in the western Mediterranean basin are currently founded on diffusionist/migrational theories. These are underpinned by theories based on the Ammerman and Cavalli Sforza (1973, 1984) wave-of-advance model that advocates a migratory movement in a west-east direction from the Near East through Western Europe.

For the western Mediterranean in particular, the Maritime Colonisation model, proposed by J. Zilhão (2001) and supported by a larger number of scholars, is used to explain this settlement process that was characterized by continuous and non-random movement, so they colonised territories not occupied previously by Mesolithic groups. This explanation acknowledges that both coastal colonisation and direct and indirect acculturation of the local Epipaleolithic people occurred (Bernabeu 1996; Carvalho 2008).

Other researchers emphasize the role played by hunter-gatherer groups in the dissemination of the Neolithic. These works, which derive from the concept of agricultural frontier of Alexander (1978), offer an image of possible interactions between hunter-gatherers and the first farmers. In this regard, the work of Zvebil (2000) suggests that a series of mechanisms that involve the acceptance of Neolithic components on the part of the Mesolithic communities (replacement) and the final Neolithic consolidation in the midst of the ancient communities of hunter-gatherers would begin after the initial contacts between these two communities (availability) (Zvebil & Lillie 2000).

Furthermore, these theories, which are based mainly on the gradual sequence of radiocarbon dates in an east-west direction and in the absence of domesticated animals and plant types in the Mediterranean basin, become even more established with the corroboration of new ar-



Fig. 1. Localisation of the study area.

archaeological evidence which indicates that the initial processes of colonisation took place during the 6th millennium BC throughout the central and western Mediterranean basin. This situation has undergone profound analysis for central Europe, as we can see from the work of several researchers (Bogucki 2000; Price *et al.* 2001; Price 2003); works that have allowed us to characterize the process of expansion and the different situations that occurred in the neolithisation of this area.

These new empirical theories are based principally on the almost simultaneous presence of similar cultural traits at different points on the Mediterranean coast. Similarly, certain decorated pottery types and some lithic materials can be used to indicate the existence of cultural groups that originated in the central Mediterranean area (Manen 2000; Fugazzola 2002) and which later spread towards the western coasts to make up these various pioneering groups. An example of this can be seen in the central Mediterranean coastal areas of the Iberian Peninsula.

## THE PROCESS OF NEOLITHIC SETTLEMENT IN EASTERN IBERIA

Archaeological investigations of the Neolithic period began more than a century ago in the Levant of Spain and have notably been intensified in the last few decades. These studies have shown that farming societies were already established in some river basins of the Southern Valencian region by the second half of the 6th millennium BC. These communities are characterized by developing an economy based on crop cultivation, mainly wheat, barley and legumes, animal husbandry (sheep, goats, pigs and cows) and, very rarely, by gathering wild fruits and by hunting wild animals. With respect to the material culture, these groups have in the impressed Cardial ceramic their best exponent; this element also allows us to link the first Neolithic groups of the east of the Iberian Peninsula with the rest of the western Mediterra-

nean ones at this time and is defined by the presence of impressed pottery as the most representative element. Excavations carried out on open air sites and archaeological surveys in the Serpis valley (Bernabeu *et al.* 2002, 2003, 2006; Barton *et al.* 2002, 2004; Molina 2001; García & Aura 2006; Esquemre *et al.* 2008) and Vinalopó valley (Torregrosa & López 2004; García *et al.* 2006; Rosser 2007) have corroborated that the initial process of colonisation by the first Neolithic communities in this area involved the settlement and integral use of these lands. Open air settlements were established on the valley floors, near to endorheic areas and water courses in order to make use of the best agricultural lands and to take advantage of the important existing biotic resources.

In addition, some natural rock cavities were occupied to develop a wide variety of socioeconomic and ideological activities (García 2004). In this respect, the caves and rockshelters with evidence of Neolithic occupation should not only be interpreted as living spaces but as places used systematically as collective tombs (Bernabeu *et al.* 2001), as sheepfolds and occasional shelters (García 2006), as well as places of special social and ideological significance. This has been proposed for some cave sites such as Cova de l'Or or Cova de la Sarsa, due to their outstanding archaeological record, basically their profusely decorated ceramics with symbolic motifs representing anthropomorphic, zoomorphic and solar symbols (Martí & Hernández 1988) and filled in some cases with similar colors to those used in rock painting (García Borja *et al.* 2004), bone tubes made of ulnas of large raptors interpreted as musical instruments associated with ceremonial practices (Martí *et al.* 2001), an extraordinary amount of ornaments made of indigenous and non-local materials (Pascual 1998).

However, the process of settlement by the first farming groups in these areas was not as rapid as it was thought, nor as constant as researchers had previously proposed. J. Zilhão's model of maritime colonisation (Zilhão 2001), which is supported by various scholars (Bernabeu 1996), offers some clues to explain the initial colonisation of the area, but it does not explain the whole process of subsequent settlement and development. By referring to the

available empirical evidence, this initial colonisation, which was localised in the areas near to some estuaries such as the Serpis river, would have been followed by a phase of expansion towards the different sections of the river and a gradual increase in the number of settlements and their consolidation. In social terms, this would bring with it the territorial organisation of a segmentary society based on farming (Vargas 1988; Sarmiento 1992).

This paper aims to develop this series of theories by bringing together the evidence recorded in the central-southern areas of the Valencian region (Bernabeu *et al.* 2003; Molina 2001; García & Aura 2006) with that from the territories located to the south of these areas (Guilabert *et al.* 1999; Soler & López 2001; Torregrosa *et al.* 2004). Difficulties appear when trying to simplify the development of the evolutionary process of neolithisation in such a complex geographical framework, because there are countless variables within this area that may have had an impact. Many of those variables may not have left any mark on the archaeological record.

However, starting from the proposal developed by Alain Gally (1989) for other areas of the Mediterranean, we believe that various sequential episodes can be proposed for the process of establishing the first farming communities in the central area of the eastern Mediterranean facade of the Iberian Peninsula:

**FIRST STAGE.** Initial colonisation: this corresponded with the pioneering phase in which groups with a farming economy, recently arrived by sea after following the coastal trade routes, settled in the fluvial plains of various river basins. They settled close to water sources where labour requirements for agricultural activities would be low given the limited labour resources available.

**SECOND STAGE.** Process of settlement growth and consolidation: this took place immediately after the initial episode of colonisation and can be identified with the neopioneering phase of A. Gally (1989). During this phase the process of social segmentation began and the initial model of occupation was repeated. However, in this moment, the socio-economic and political dynamics of the community were concentrated and defined.

**THIRD STAGE.** Colonisation of external river basins outside the initial territories: settlement growth of the neopioneering phase would also have affected nearby river basins where there were reoccupations of Mesolithic settlements abandoned around 6000 cal BC and there have been recorded occupations *ex novo*. In this episode, the differences between the various rivers – those occupied initially and those occupied subsequently from the earlier ones – are now practically nonexistent, with similar material culture and farming practices established in both. Territorially, the only difference is that there was probably a higher density of settlements in the initial territo-

ries due to the fact that the process of segregation took place earlier and was more intense.

## THE INITIAL COLONISATION PROCESS IN THE MEDITERRANEAN CENTRAL FACADE OF THE IBERIAN PENINSULA

According to the maritime colonisation model (Zilhão 2001) and the empirical evidence, the first coastal Neolithic groups spread from various river estuaries, such as the Serpis river. These groups moved towards Southern Iberia following fluvial courses and settled the lands around them. The archaeological evidence and the radiocarbon dates suggest that this process probably took place in a relatively short period of time.

The first settlements of groups with a production economy and impressed decorated wares spread around 5600/5500 cal BC to the areas between the Serpis and Algar rivers, creating what is known as the Valencian Cardial Group (Bernabeu 1996). This settlement came to an area in which the Mesolithic settlements had disappeared about 500 years before during the Recent Mesolithic Phase B (Juan-Cabanilles & Martí 2002), that is, the archaeological evidence supports a lack of interaction between Neolithic pioneering groups and Mesolithic societies in the Serpis basin.

The evidence recorded so far from El Barranquet in Oliva (Valencia) is important to explain this initial occupation. This site, located just 300 metres from the present day coast line, has revealed a stratigraphic layer within a natural paleochannel (Esquembre *et al.* 2008). This layer contains a relatively low number of pottery fragments, amongst which there were even fewer examples of Cardial wares in comparison to other types of grooved and tool impressed decorated wares (Esquembre *et al.* 2008: fig. 4).

The characteristics of this pottery collection are similar to those of the *sillon d'impressions* one, which has been identified and defined in various sites in the French Provence region (Peiro Signago, Grotte de Bize, Grotte de Féés, etc.) (Manen 2002). This is dated to between 5800 and 5400 BC and is characterized by a decorative technique founded in geometric designs with bands, zig-zags, short impressions, larger impressions forming triangular motifs and other designs. Other decorative techniques are also represented, including Cardial and tool impressed wares and grooved ware, but only in small numbers of pieces. The US 79 of El Barranquet has been dated between 5500 and 5460 cal BC using the 1 sigma calibration obtained from an *Ovis aries* (Beta-221431: 6510 ± 50 BP). Furthermore, the characteristics of the pottery evidence indicate that the initial occupation of

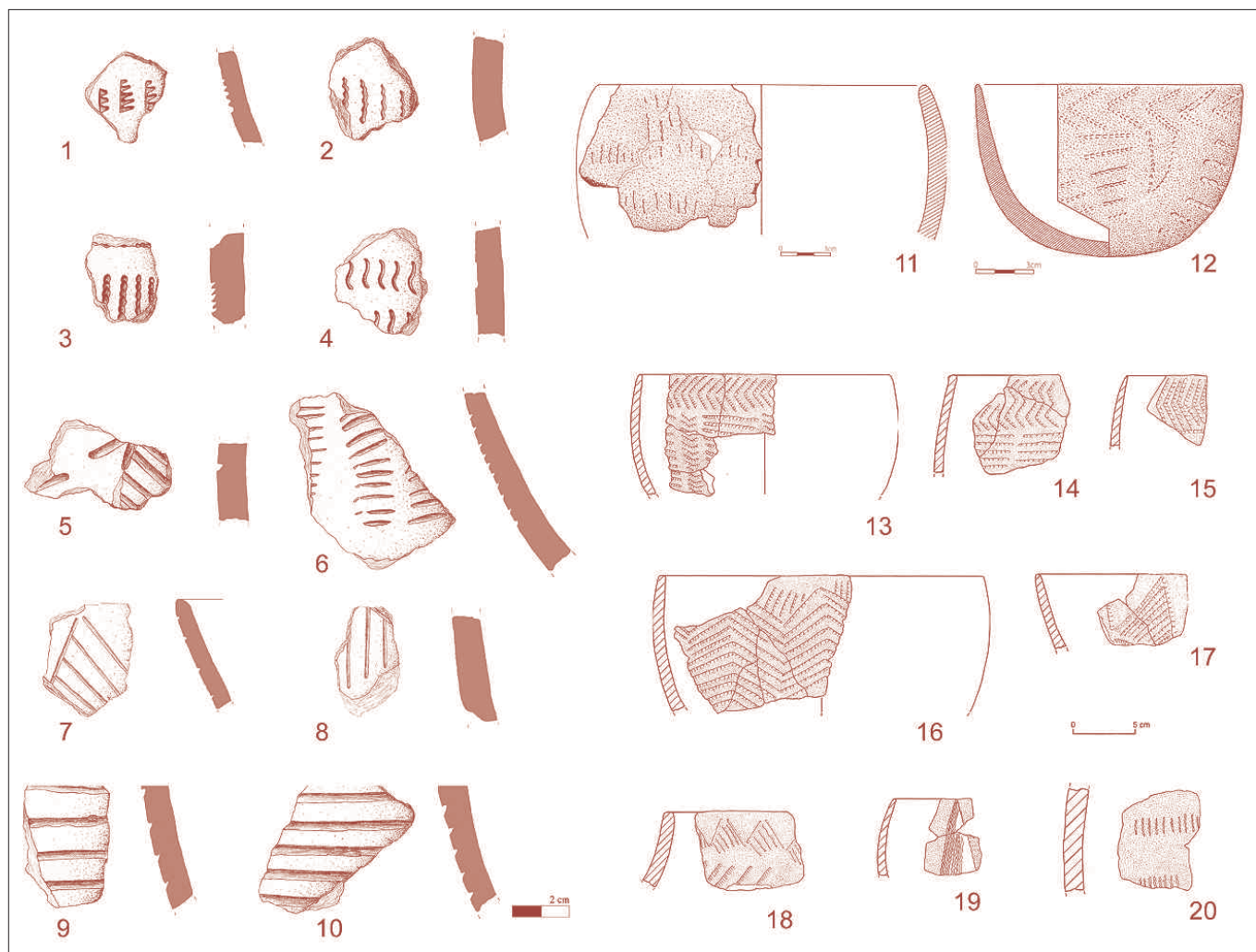


Fig. 2. Ceramics decorated by the technique of “sillon d'impressions”, impressed with shell and incised. 1-10: El Barranquet (Esquembre *et al.* 2008); 11-12: Pont de Roque-Haute (Manen & Guilaine 2007); 13-20: Peiro Signado (Manen 2002).

the site in Oliva is similar to that found in other early Neolithic contexts in the French Provence region (Bernabeu *et al.* 2009).

Early Neolithic horizons of Cova de les Cendres (Teulada-Moraira, Marina Alta) (levels XI, IX and X of the sector A) are, like those at Barranquet, ones of intensive exploitation of marine resources. Another characteristic of the first occupation of the cavity is the discovery of several fragments with painted decoration (Bernabeu 1995: 40; Bernabeu & Molina 2009: 82), poorly documented in the classical Cardials contexts and more typical of the forms of southern Italy.

The Cova Ampla del Montgó (Xàbia-Jàvea, Marina Alta) could also be related to the contexts given in central Italy from some ceramic fragments with decorative patterns reminiscent of the style known as *linee dentellate* or BPF – Basi-Pienza-Filiestru – (Soler Díaz 2007: 38), a typical style of the Italian coastal basin situated between the Arno and the Tiber and the Tuscan islands that can be distinguished due to decorations of vertical impressions using a shell with jagged edges (mainly Car-

dium), the so-called *ceramica impressa* style Guadone (Tine 2002), although its presence is also evident in different areas of the western Mediterranean.

However, the timing of  $^{14}\text{C}$  is not limited to the initial presence of Neolithic coastal sites, because it also occurs at an early stage in the interior valleys of occupations. This could be considered simultaneous to the beginning of the Neolithic occupation at this point in the Mediterranean coast of the Iberian Peninsula. In this aspect, the level VIII of Cova d'En Pardo (Planes, El Comtat/Condado de Cocentaina), defined by the existence of a hearth with hunting remains, is characterized by the presence of a ceramic vessel with a decoration of imprints made with a simple pointed instrument which allows us to relate it with different Mediterranean regions, especially Liguria. Characteristics of this set allow us to infer the existence of a sporadic presence that must be placed chronologically in the last moments of the first half of the 6th millennium cal BC (Beta-231880:  $6660 \pm 40$  BP; 5626-5558 cal BC). This occupation overlaps another level – VIII – immediately separated from the previous one by

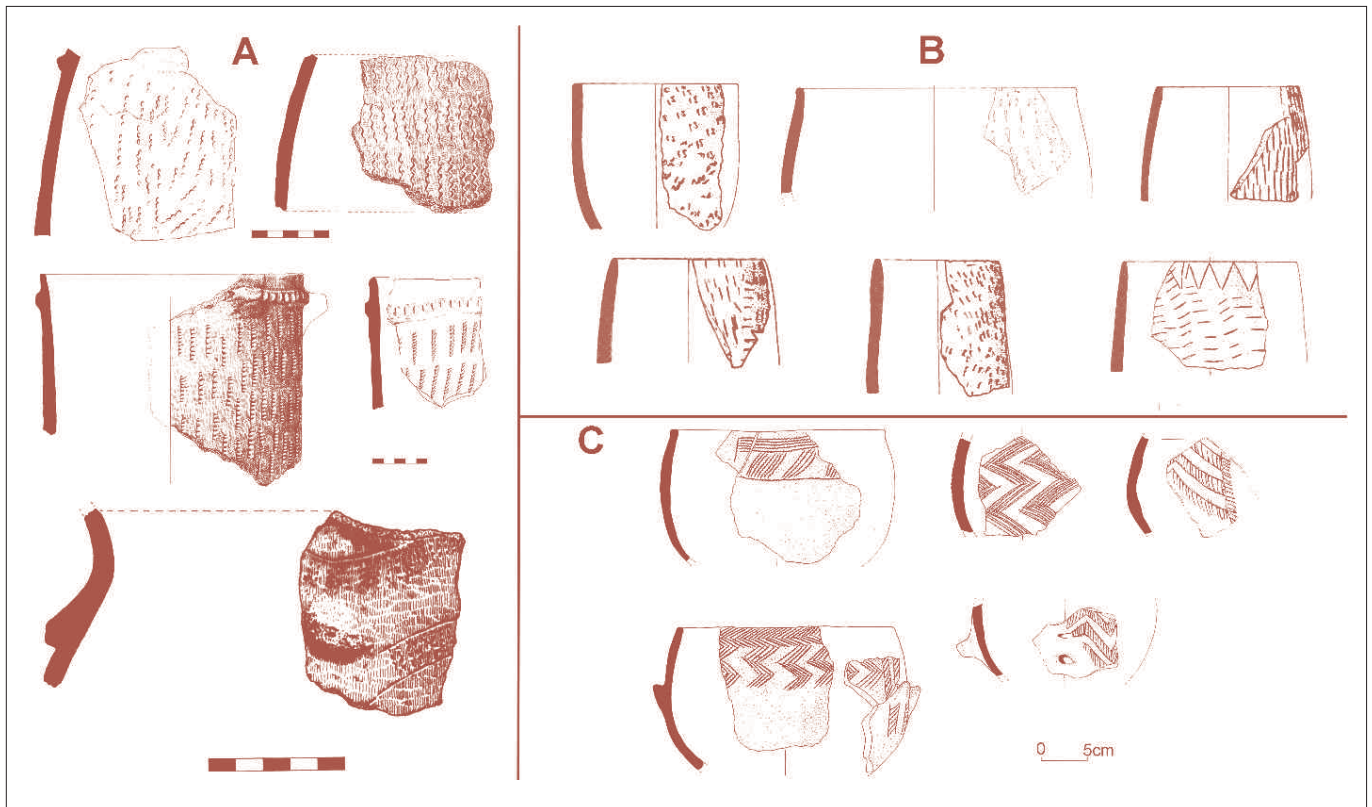


Fig. 3. Ceramics of Cova Ampla del Montgó (A: Esquembre & Torregrosa 2007), *ceramica impressa* style Guadone (B: Tiné 2002) and impressed pottery of the Tyrrhenian (C: Grifoni 2001).

just 50 years, which, given for its ceramic record, should be characterized as Cardial (Soler *et al.* in press).

The presence of evidence before the Cardial Ware, also documented in other caves, as in the case of the Cova de Sarsa (Bocairent-Bocairente, Vall d'Albaida-Valle de Albaida), suggests possible relationships with the *sillon d'impressions* horizon in the Ligurian-Provençal regions (Cortell & García 2007).

However, the current radiocarbon framework does not exclude the presence of pioneers to this coastal sector, because it also occurs in the interior valleys of occupations in that moment; those occupations should be simultaneous or appear immediately after those in the beginning of the Neolithic occupation of the Mediterranean coast of the Iberian Peninsula at this point. The choice of sites in the interior of valleys is supposed to respond to a desire to control those

resources in a more assiduous way (in terms of exploitation) by a community with a production economy, always choosing the best land to locate settlements in a stable model of occupation which is reflected perfectly in the area of Les Puntes (Benifallim-Benilloba-Penàguila/Penàguila, L'Alcoià-El Comtat/Hoya de Alcoy-Condado de Cocentaina) (Bernabeu *et al.* 2002, 2003). Currently the pioneering occupation in the center of this ancient

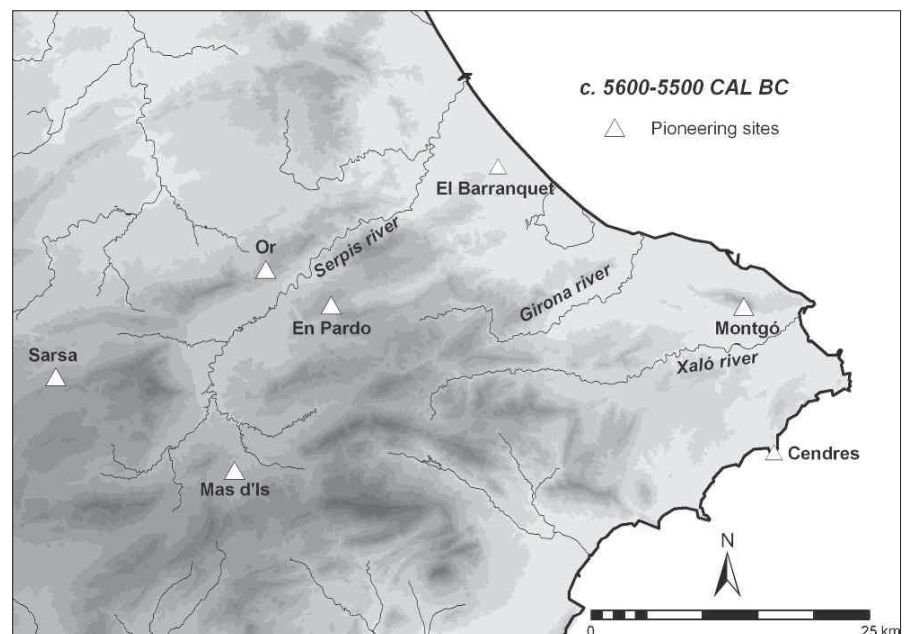


Fig. 4. Location of the archaeological Neolithic sites mentioned in the text linked to the process of pioneering expansion.

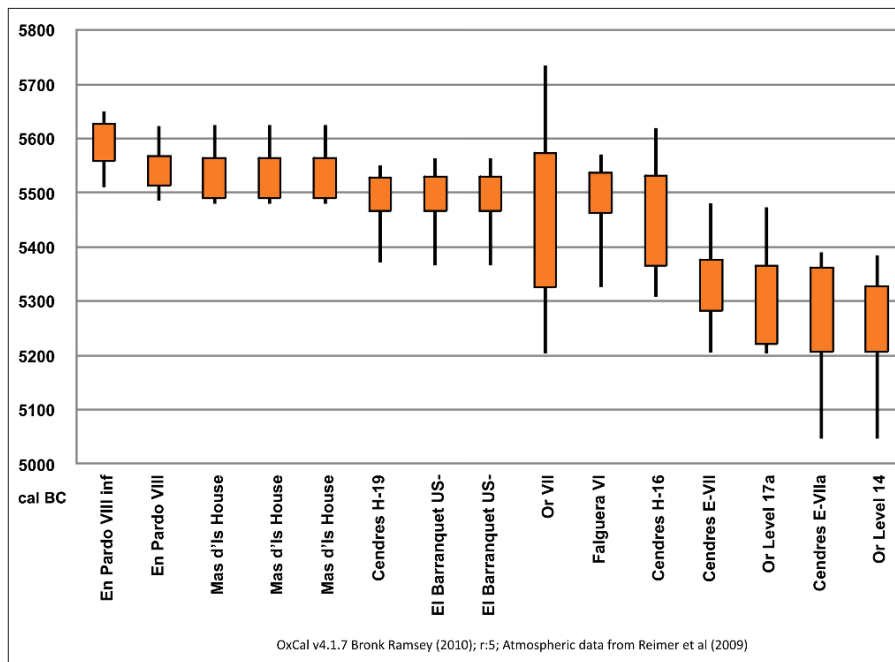


Fig. 5. Radiocarbon chronology for pioneer contexts.

The structures recorded on French sites associated with this pioneering phase do not indicate a long occupation (Manen 2002), but more isolated periods of occupation. This pattern can also be seen in the occupation of El Barranquet in Oliva and in some of the domestic structures in Mas d'Is (Houses 1 and 2). The evidence from these sites is closely related to the isolated nature of the pioneering communities which spread to different points of the western Mediterranean around the middle of the 6th millennium BC.

endorheic basin provides evidence for a number of scattered huts that have no tangible physical demarcation; locations that could correspond to structures that would house family units with a degree of self-sufficiency (farms), a conclusion supported by the association with small domestic structures (pits, homes, grinding stones, etc.). This independence can also be inferred from the technological characteristics of ceramics that point, according to analysis of ceramic fragments in House 1 (sector 52; Beta-166727:  $6600 \pm 50$  BP; 5620/5481 cal BC) and House 2 (sector 80; Beta-162092:  $6600 \pm 50$  BP; 5620/5481 cal BC) in Mas d'Is, to fully independent productions that might relate to a system of vertical technology transfer between generations (McClure 2007: 500). Furthermore, the site of Mas d'Is can also be linked to contexts distinguished by the presence of several ceramic fragments decorated with *sillon d'impressions* (Bernabeu *et al.* 2009) that appear in some of the oldest structures (House 1 and Ditch 5) jointly with a typical ceramic of the Cardial horizon.

According to J. Guilaine and C. Manen (2002), the presence in the Ligurian-Provencal region of decorated pottery associated with the different Italian facies of the impressed ware horizon is most likely the result of occasional incursions by sea and of an initial occupation of these sites. This means that there would have been pioneering settlements established ca. 5750-5500 cal BC, at the same time that the facies of impressed potteries in southern Italy were at their point of maximum development, and which probably influenced various areas along the Tyrrhenian (Fugazzola 2002), Ligurian (Binder & Maggi 2001; Manen 2000), French Provence coasts (Manen 2002; Guilaine & Manen 2007) and possibly the east coast of the Iberian Peninsula.

## THE CONSOLIDATION OF SETTLEMENTS AND TERRITORIES BY NEOLITHIC GROUPS

There is no doubt that once the first farming groups were established in open air sites, a process of demographic growth and consolidation began which brought with it social stabilisation. This is substantiated by the appearance of a series of characteristic elements which reflect the organisation of a defined social territory.

This consolidation can be linked culturally to the Cardial horizon *sensu stricto* (ca. 5500-5300 cal BC) and results from a process of structured demographic expansion. It coincides with a socio-economic system better suited to environmental diversity and a wide range of economic systems. This episode coincided with the development of the Franco-Iberian Cardial group which is defined by the predominance of impressed decorated pottery, followed by applied decorations and occasionally by incised and grooved decoration. There is also a close relationship between large vessels and decorated cordons.

Within the Franco-Iberian region there are certain regional variations characterised by the scarcity of perpendicular impressed decoration using the edge of a shell, which is more representative of the Italian facies and the dominance of impressed decoration using the natis of the *Cerastoderma edule*, primarily seen in the Catalonian and Valencian regions. Decorative impressed motifs appear arranged in well defined bands and are frequently filled with geometric motifs; a decorative syntax that separates the Cardial culture from that of the Italian facies observed within the pioneering episode of the early settlements.

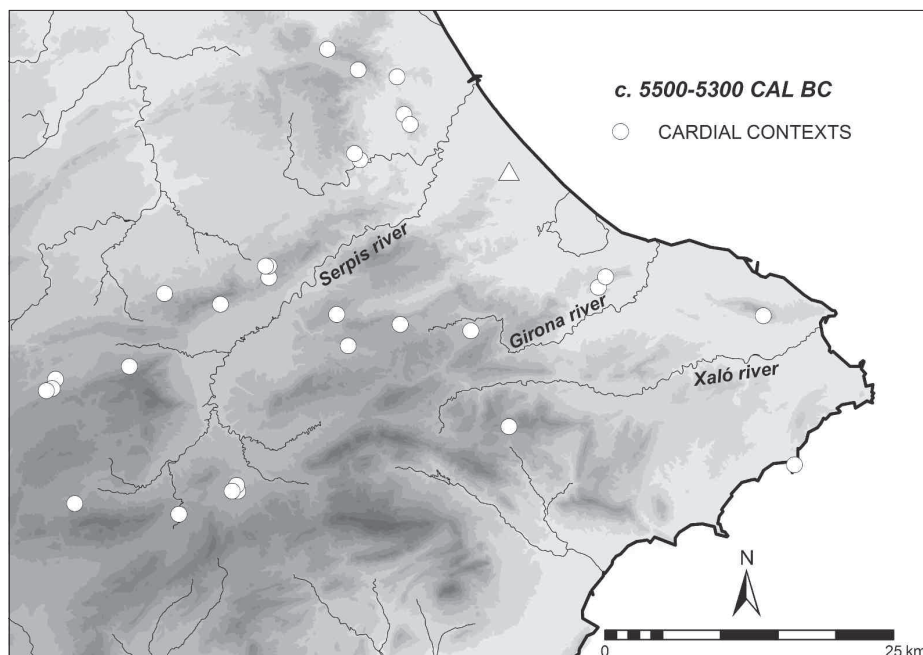


Fig. 6. Location of the archaeological sites with ancient Cardial contexts in the central-southern region of Valencia.

these groups is difficult to establish, and they could be understood as just one group which exploited different areas simultaneously or as various family groups which were spread out in the valley. The variety of activities which appear to have been developed in these settlements and the long time period indicated by the monumental ditches at Mas d'Is show stable occupation of these settlement sites. The presence of these monumental ditches has been explained as an element of

According to J. Guilaine and C. Manen (2002), this Cardial horizon is directly associated with the process of consolidation and expansion of the Neolithic period in Provence and Languedoc (France). From the recent findings mentioned earlier, a similar scenario can be considered for the coastal and pre-littoral areas located in central-south Valencian region. As we have seen in previous works (Garcia 2007, 2009), this expansion probably corresponds with the period when the farming economies in these lands were fully consolidated. The territorial organisation is characterised by a wide range of settlement types on the plains, as well as in the caves which were aimed at the integral management of agricultural and livestock resources, but also for hunting and other resources associated with the seasonal vegetation of the area.

A good example of this process of territorial segregation, strengthening and consolidation is found in the Penáguila valley (the areas of Les Puntetes and Els Dubots) which are documented in eight new sites characterized by the presence of Cardial pottery (Molina 2001). This points to the possible existence of various settlement sites in a territory covering approximately 17 km<sup>2</sup>. The relationship between

social aggregation associated with social practices designed to strengthen tribal ties (Bernabeu *et al.* 2003).

The distance between settlements varies, with the nearest sites being 0.5 km apart and the furthest 3 km apart, with a mean distance of 1.07 km. There are also differences in the distribution of the sites. The distance between sites located on the valley floors (where the fertile lands are more abundant and of better quality) is constant, around 0.5 km. Whereas the settlement sites located on the sides or in the upper areas of the valleys are further apart, about 2 km. This is where potentially cultivable lands are less abundant and it coincides with the pioneering Neolithic phase suggested by Gallay (1989), which is also observed in Catalonia (Mestres 1992).

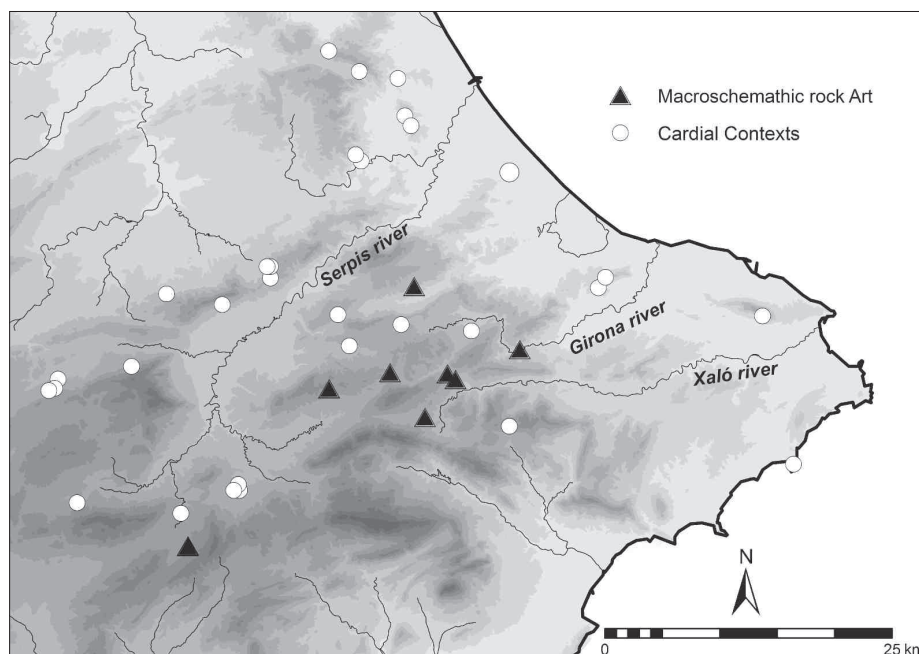


Fig. 7. Location of the archaeological sites with ancient Cardial contexts in the central-southern region of Valencia and the sites with Macroscopic rock Art.

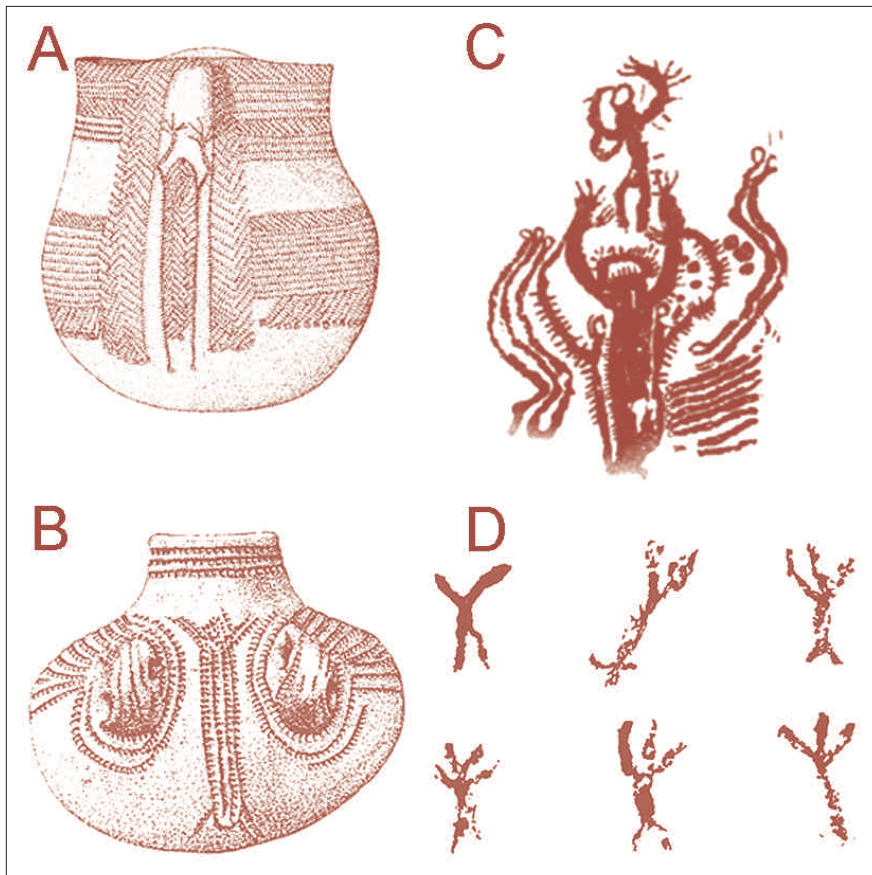


Fig. 8. Macroscopic Art. A: Impressed cardial ceramic from Cova de l'Or (Martí & Hernández 1988); B: Anthropomorphic figure in prayer position in rock art (Pla de Petracos; Hernández *et al.* 1988). Schematic Art. C: Impressed cardial ceramic from Cova de l'Or (Martí & Hernández 1988); D: Anthropomorphic motifs of a double "Y" (Abric de Benialí; Hernández *et al.* 1988).

with the area defined by the limits of the distribution of Macroscopic Art. This area probably increased in size later – the Neo-pioneering phase – to include the lands between the sources of the Clariano, Serpis and Algar rivers and the Mediterranean Sea. In this way, Schematic Art, including portable art as well as rock art, could be considered as another indicator which, together with other material culture evidence, can be used to define the territory where the pioneering groups were consolidated (Torregrosa & Galiana 2001; Fairen 2004, 2006).

To sum up, there are a number of indicators which allow us to propose that the effective occupation of the Valencian lands occurred during the first centuries of second half of the 6th millennium BC. This occupation began with the process of segregation and territorial expansion in the lands between the Serpis and Algar rivers with the aim of consolidating a social entity based on agricultural subsistence. These indicators include: the construction of the large ditches at Mas d'Is, which span a considerable period of time; the increase in the number of sites with Cardial pottery within the initially occupied territories; the use of caves for burial practices; and the development of a series of unique artistic manifestations such as Macroscopic and Schematic rock art.

The analysis of the spatial distribution of Macroscopic and Ancient Schematic Art has indicated that both appear to be closely associated with the territorial expansion of the pioneering production economy groups. In this respect, the distribution of Macroscopic Art and some Schematic Art motifs (especially the anthropomorphic motifs of a double "Y", the sun and lineal branch motifs, representations that have their parallels in the Cardial pottery) appear to define an area within the initial Cardial territory (Hernández, Ferrer & Catalá 1988; Torregrosa 2001), located among Benicadell, Aitana and Mariola mountain ranges (Martí & Juan 1987).

Therefore, we propose that there was an initial nuclear zone – the pioneering phase – which probably coincided

## THE NEO-PIONEERING EXPANSION AND COLONISATION TOWARDS SOUTHERN AREAS

At the end of the 6th millennium BC (5300-4900 cal BC, Epicardial Neolithic), at the same time as the episode of settlement strengthening and territorial consolidation by the producing groups established in the initially colonised river basins, a certain homogeneity can be observed in the archaeological record.

As indicated by the archaeological record and chronologically documented, the various structures in Mas d'Is (Bernabeu *et al.* 2003, 2006), were joined by the construction of Ditch 4 about 300/400 years later (ca. 5050 cal BC) which seems to have a relation of concentricity with Ditch 5, which at present appears to be partially clogged. This horizontal stratigraphy would indicate that the outer ditch (4) inherited the social function of the former. The amount of recognized evidence of the final centuries of the 6th millennium BC increases on the surface over the previous periods. This evidence, now characterized by the presence of incised and printed pottery, is available throughout the Penáguila river valley. This is recorded in the areas initially occupied, as well as in those located more to the south of the Serpis valley. The empirical base currently available suggests that there are



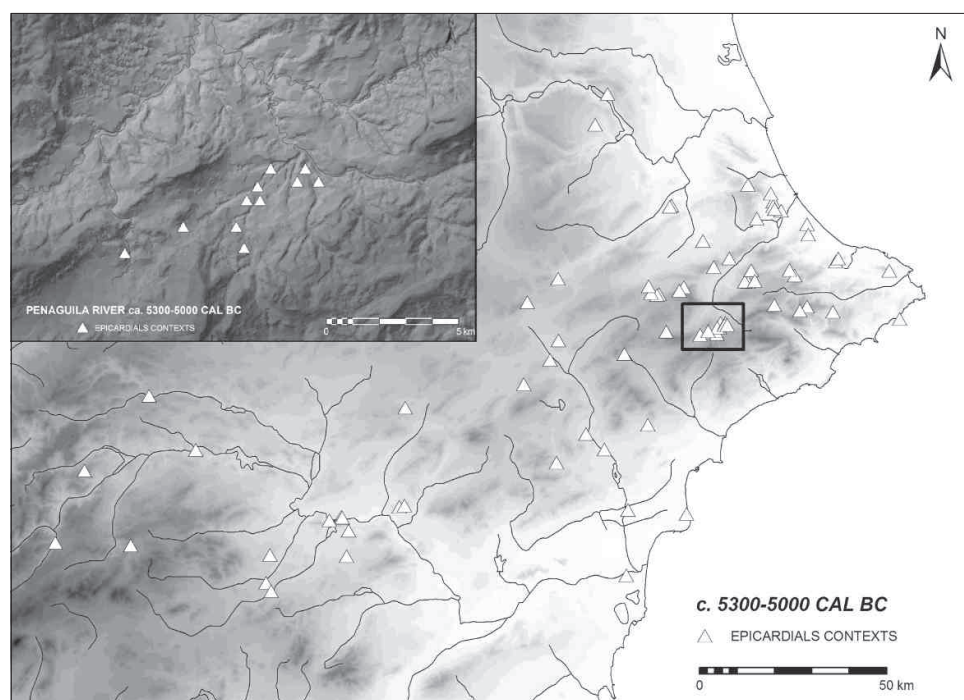


Fig. 9. Localisation of the archaeological sites with epicardial contexts in the Mediterranean central area of the Iberian Peninsula.

two distinct ways in which the colonisation of the river basins located to the south of the Serpis river could have occurred.

The first way is corroborated by the sites located in the Villena basin and also in those close to the main nucleus of farming communities. In these areas it has been traditionally considered that contacts between Neolithic Cardial groups and local Epipaleolithic groups with a Tardenoisian industry existed. However, and as shown by J. Juan-Cabanilles and B. Martí (2002), the sites of Casa de Lara and Arenal de la Virgen were probably reoccupied by farming groups during the expansion phase from the original nucleus. This assertion is supported by the absence of elements for Recent Mesolithic Phase C (6000-5500 cal BC) at these sites, a fact which would invalidate the proposal neolithisation process of the last hunter-gatherers of the Upper Vinalopó valley. This is indicated by the abundance of incised and relief decorated pottery, tool impressed wares and combed decorated wares, in contrast to the limited quantities of Cardial pottery recorded. This pottery evidence from later phases in the ancient Neolithic sequence, together with a significant number of “Jean Cros” trapezoids, arrows points exclusive to the ancient Neolithic Cardial. This is a process similar to that seen on sites in the Serpis river basin where a technological and temporal hiatus between the Recent Mesolithic and Neolithic occupations has been recorded.

The second way is indicated by sites without evidence of earlier geometric Mesolithic occupation, and which therefore may have been created *ex novo* during the colonisation of these new lands in the Valencian region (Guilabert *et al.* 1999; Soler & López 2000/2001; García

2007) and the south-east Iberian Peninsula (Martínez 1994; Salmerón 1999). Studies of these sites, including the relief and incised-impressed decorated wares, as well as the available dates (Colon: Beta 227572: 6390 ± 40 BP, 5470/5330 cal BC 1σ, García *et al.* 2006; Abrigos del Pozo: I-16783: 6260 ± 120 BP, 5360/5050 cal BC 1σ, Martínez 1994), suggest that they date to the last centuries of the 6th millennium BC. The expansion process from the pioneering zones coincides with a considerable increase in the number of settlements located near the initial Neolithic settlements that have been discussed earlier.

Therefore, the effective colonisation of the river basins situated to the south of the consolidated pioneering area nucleus had already taken place by the beginning of the 5th millennium BC. It is apparent that the process of expansion and colonisation of new lands took place along the natural corridors which communicated with the interior Meseta area and the south-east of the Iberian Peninsula. The lands were colonised from the upper Clariano river to the south-west following the Vinalopó and the Yecla/Jumilla corridor.

This process of expansion probably occurred in a similar way in areas even further away, such as the basin of Segura river and the source of the Mundo-Segura river. The colonisation also took place in the opposite direction, towards the south-south-east, along the Vinalopó valley (Hernández 1997) to its estuary and continuing towards the lower fertile plains of the Segura river. This process also took place from the source of the Montnegre river towards the Campo de Alicante as well as from the source of the Penaguila river along La Torre valley.

The new sites recorded in the Vinalopó, Montnegre and Segura river basins, along the Yecla-Jumilla corridor, are situated within the space of a number of kilometres from each other, and they occupy the different lower areas of the river basins. They are located in places with abundant water resources and great agricultural potential; therefore they tried to minimize the risks of poor harvests, to reduce the investment of labour required for agricultural tasks and to repeat the model of settlement

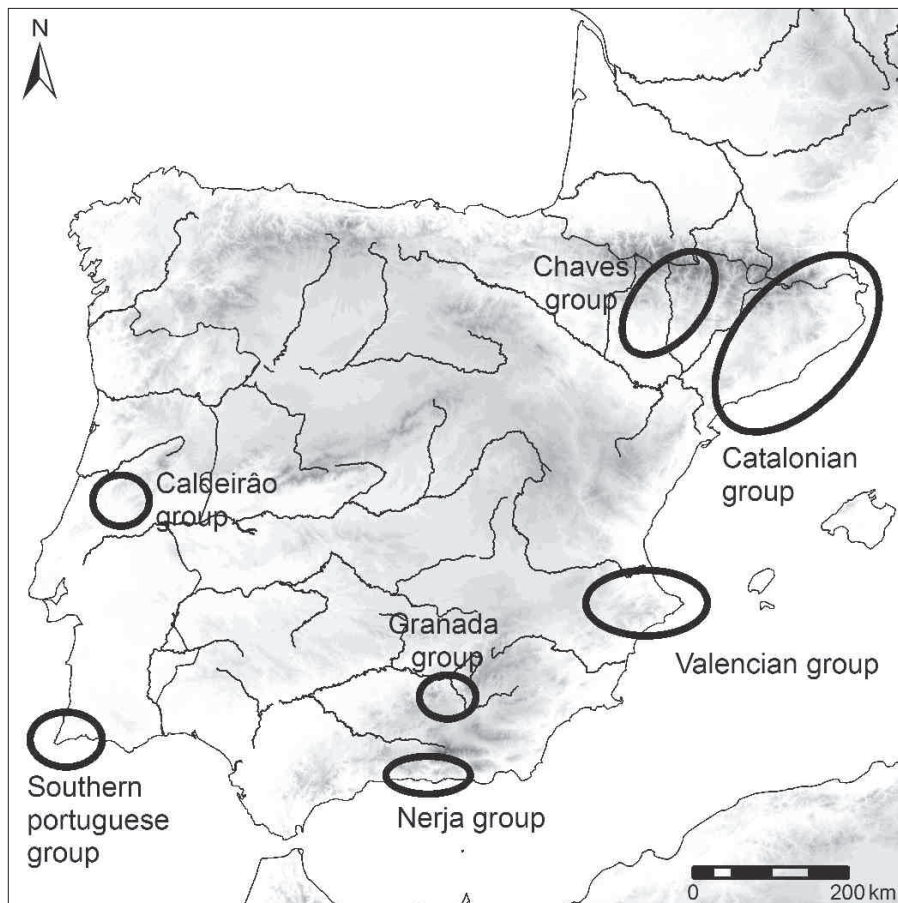


Fig. 10. Localisation of ancient Neolithic groups in the Iberian Peninsula.

rizon in which different groups could intervene with cultural roots without being homogeneous at all.

On the other hand, it also considers a settlement linked to the Cardial horizon of the Provençal region in which cultural elements are maintained (i.e. *sillon d'impressions*) reflecting its central Mediterranean roots. The presence of Ligurian elements within the Cardial complex in stratified contexts relegates these intrusive elements to mere cultural memories associated with Franco-Iberian Cardial traditions. Moreover, lithic production in early Neolithic contexts of the Iberian Peninsula has obvious similarities with the Cardial contexts in western Languedoc and Provence, and shows clear differences with the Tyrrhenian contexts. Regardless, it is clear that the

and establishment which occurred in the initially colonised territories.

## CONCLUSIONS

The data presented fit the idea of a progressive process of establishment and segregation of extended family communities that occupied the best lands preferentially to develop agricultural practices, but without implying that their economy was based solely on the development of an agrarian economy. Perhaps, the most significant aspect is the effective colonisation of the valley floor areas but with a much lower demographic density in the valley margins. The archaeological record currently has two ways to understand the Valencian central regions and, by extension, the Mediterranean area of the Iberian Peninsula.

On the one hand, it could be a pioneering settlement related to elements of the Tyrrhenian area and/or Ligurian coast later evolving an independent and native Cardial horizon in each area. This option, which is supported by the evidence of El Barranquet will require the dating of a larger number of archaeological contexts to be confirmed. However, it is true that this settlement could be a unicum within a more extensive and complex area characterized by the polymorphism of the first Neolithic ho-

neolithisation from the east of the Iberian Peninsula is related to an arrhythmic expansion phenomenon, probably with its origin in different sources.

After this deployment of pioneering occupations, characterized by multi-functional tasks and linked to the natural environment to minimize the inherent risks to the farming economy which was unconsolidated territorially or demographically, each of the Cardial Neolithic groups would have developed independently as evidenced by the differences observed in the archaeological records of the different Cardial areas: Valencian group (Serpis basin) Catalonian group (Vallés-Panadés plains with probable extension into the Gironés and Roussillon) and Chaves group (prepirinean region of Huesca) that have their own characteristics, but always with common elements of the Cardial Neolithic. Similar to the independence of these Cardial areas, other significant differences can be found, as in the presence of the unique Valencian ceramic shapes (handle-spout, barrels, double cups, cylindrical flat bottom) (Willigen 2004: 476), but also the extraordinary baroque decorations of Cardial pottery in the Serpis area, which represents its best display of figurative motifs (Martí & Hernández 1988), or the development in this same region of Macroschematic rock Art (Hernández 2003), an artistic horizon common in the central Valencian region and that has no analogies in other areas of Cardial introduction.

During the final years of the 6th millennium cal BC, the same strategy of occupation and exploitation of the territory was still used, but there were significant changes that resulted in an expansion of settlements outside the nuclear area of the Penáguila valley. Thus, in this moment, coinciding with the abandonment of Ditch 4 of Mas d'Is, there were profound changes that resulted in an expansion of settlements outside the nuclear area of the Penáguila basin and there was also more diversity in the pattern of settlements. The locations around the Penáguila river are not anymore the only known Neolithic presence, although there is still evidence of them, as demonstrated by the reuse of the land formerly occupied by the ditches and the presence of a series of excavated structures that have been interpreted as palisades (Bernabeu *et al.* 2006).

During these times (Epicardial Neolithic; ca. 5300-4900 cal BC) this proliferation of settlements out of the Penáguila basin could be the response to the segmentation of the different housing units settled in the valley, due to the growth of the population and/or the need for extra systems of fields. But this segregation is not a complete break from the model of occupation and of land management observed so far. The sites detected outside Penáguila replicate the system known until now, that is, they occupied areas closely linked to water resources. This obvious following of the settlement pattern suggests a continuation of the agricultural methods and of the production system.

In the final moments of the 6th millennium cal BC changes can also be seen in the functionality and the seasonality of several caves or rock shelters, although they may represent more an intensification of the occupation than a change. Several fields that were previously used as places of habitat, sporadic occupations or shelters had transformed intensity of occupation, becoming pens for livestock.

Thus, the decrease in Cardial pottery, the abandonment of the monumental ditches of Mas d'Is and the disappearance of the Macrosquemathic rock Art are clear evidence of the breakdown of social patterns established after the initial unity and the loss of traits crucial in the identity of the Cardial society.

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## REFERENCES

- ALEXANDER, J. 1978. Frontier studies and the earliest farmers in Europe, in *Social Organisation and Settlement*, eds. D. Green, C. Haselgrove & M. Spriggs. British Archaeological Reports, International Series 47(1), pp. 13-29. Oxford.
- AMMERMAN, A.J. & L.L. CAVALLI-SFORZA.  
— 1973. A population model for the diffusion of early farming in Europe. In *The explanation of Culture Change: Models in Prehistory*, ed. C. Renfrew, pp. 343-357. Gloucester Crescent: Duckworth.  
— 1984. *The Neolithic transition and the genetics of population in Europe*. Princeton: Princeton University Press.
- BARTON, C.M., J. BERNABEU, J.E. AURA, O. GARCÍA PUCHOL & N. LA ROCA. 2002. Dynamic landscapes, artifact taphonomy, and land use modeling in the western Mediterranean. *Geoarchaeology* 17: 155-190.  
<<http://onlinelibrary.wiley.com/doi/10.1002/gea.10008/pdf>>.
- BARTON, C.M., J. BERNABEU, J.E. AURA, O. GARCÍA PUCHOL, S. SCHMICH & L. MOLINA. 2004. Long-term socioecology and contingent landscapes. *Journal of Archaeological Method and Theory* 11: 253-295.
- BERNABEU, J. 1996. Indigenismo y migracionismo. Aspectos de la neolitización en la fachada oriental de la Península Ibérica. *Trabajos de Prehistoria* 53(2): 51-65.
- BERNABEU, J., L. MOLINA, M.A. ESQUEMBRE, J.R. ORTEGA & J.D. BORONAT. 2009. La cerámica impresa mediterránea en el origen del Neolítico de la Península Ibérica. En *De Méditerranée et d'ailleurs... Mélanges offerts à Jean Guilaine*, pp. 83-95. Toulouse: Archives d'Écologie Préhistorique.
- BERNABEU, J., L. MOLINA, A. DÍEZ & T. OROZCO. 2006. In-

- qualities and power. Three millennia of Prehistory in Mediterranean Spain (5600-2000 cal BC), in *Social inequality in Iberian Late Prehistory*, eds. P. Díaz-del-Río & L. García. British Archaeological Reports, International Series 1525, pp. 97-131. Oxford.
- BERNABEU, J., T. OROZCO, A. DÍEZ, M. GÓMEZ & F. J. MOLINA. 2003. Mas d'Is (Penàguila, Alicante): aldeas y recintos monumentales del neolítico inicial en el valle del Serpis. *Trabajos de Prehistoria* 60(2): 39-59. <<http://tp.revistas.csic.es/index.php/tp/article/view/80/80>>.
- BINDER, D. & R. MAGGI. 2001. Le Néolithique ancien de l'arc liguro-provençal. *Bulletin de la Société Préhistorique Française* 98 (3): 411-422. <<http://dx.doi.org/10.3406/bspf.2001.12528>>.
- BOGUCKI, P. 2000. How agriculture came to north-central Europe. In *Europe's First farmers*, ed. T.D. Price, pp. 197-218. Cambridge: Cambridge University Press.
- BRONK RAMSEY, C. 2009. Bayesian analysis of radiocarbon dates. *Radiocarbon* 51(1): 337-360.
- ESQUEMBRE, M.A., J.D. BORONAT, F.J. JOVER, F.J. MOLINA, A. LUJÁN, J. LÓPEZ, R. MARTÍNEZ, P. IBORRA, C. FERRER, R. RUIZ & J.R. ORTEGA. 2008. El yacimiento neolítico del Barranquet (Oliva). In *IV Congreso del Neolítico de la Península Ibérica (Alicante, 2006)*, pp. 217-230. Alicante: MARQ.
- FAIRÉN, S.
- 2004. Rock art and the transition to farming. The Neolithic landscape of the central Mediterranean coast of Spain. *Oxford Journal of Archaeology* 23(1): 1-19.
- 2006. *El paisaje de la neolitización: arte rupestre, poblamiento y mundo funerario en las comarcas centro-meridionales valencianas*. Alicante: Servicio de Publicaciones, Universidad de Alicante.
- FERNÁNDEZ, J. 1999. *El yacimiento prehistórico de Casa de Lara, Villena (Alicante). Cultura material y producción lítica*. Villena: Fundación José María Soler.
- FORTEA, J. 1973. *Los complejos microlaminares y geométricos del Epipaleolítico mediterráneo español*. Salamanca: Universidad de Salamanca.
- FUGAZZOLA, M.A. 2002. Le facies a ceramica impressa dell'area medio-tirrenica. In *Le ceramiche impresse nel Neolitico antico. Italia e Mediterraneo*, eds. M.A. Fugazzola, A. Pessina & V. Tiné, pp. 97-116. Roma: Istituto Poligrafico.
- GALLAY, A. 1989. La place des Alpes dans la néolithisation de l'Europe. In *Néolithisations*, eds. A. Aurenche & J. Cauvin. British Archaeological Reports, International Series 516, pp. 227-254. Oxford.
- GARCÍA ATIÉNZAR, G.
- 2004. *Hábitat y territorio. Aproximación a la ocupación y explotación del territorio en las comarcas centro-meridionales valencianas durante el Neolítico Cardial*. Villena: Fundación José María Soler.
- 2006. Abrigos, valles y pastores. Análisis espacial del paisaje pastoral en tierras centro-meridionales valencianas. In *La Aplicación de los SIG en la Arqueología del Paisaje*, ed. I. Grau, pp. 149-170. Alicante: Universidad de Alicante.
- <<http://gabrielgarciaatienzar.files.wordpress.com/2009/02/12-garcia-atienzar.pdf>>.
- 2007. *La neolitización del territorio. El poblamiento neolítico en el área central del mediterráneo español*. Alicante: Universidad de Alicante.
- <<http://rua.ua.es/dspace/handle/10045/7752>>.
- 2009. *Territorio Neolítico. Las primeras comunidades campesinas en la fachada oriental de la Península Ibérica (ca. 5600-2800 cal BC)*. British Archaeological Reports, International Series 2021. Oxford.
- GARCÍA, G., F.J. JOVER, C. IBÁÑEZ, C. NAVARRO & D. ANDRÉS. 2006. El yacimiento neolítico de la Calle Colón (Novelda). *Recerques del Museu d'Alcoi* 15: 19-28. <<http://www.raco.cat/index.php/RecerquesMuseuAlcoi/article/viewFile/172605/224957>>.
- GARCÍA, O. & J.E. AURA, EDS. 2006. *El abric de la Falguera (Alcoi, Alacant). 8.000 años de ocupación humana en la cabecera del río de Alcoi*. Alcoi: Ayuntamiento de Alcoi.
- GARCÍA, O. 2005. *El proceso de neolitización en la fachada mediterránea de la Península Ibérica. Tecnología y tipología de la piedra tallada*. British Archaeological Reports, International Series 1430. Oxford.
- GUILABERT, A.P., F.J. JOVER & J. FERNÁNDEZ. 1999. Las primeras comunidades agropecuarias del río Vinalopó (Alicante). In *II Congrés del Neolític a la Península Ibèrica*. Saguntum-PLAV, Extra 2, pp. 283-290.
- GUILAINE, J. & C. MANEN. 2002. La ceramica impressa della Francia meridionale. In *Le ceramiche impresse nel Neolitico antico. Italia e Mediterraneo*, eds. M.A. Fugazzola, A. Pessina & V. Tine, pp. 37-49. Roma: Istituto Poligrafico.
- HERNÁNDEZ, M.S. 1997. Agua, río, camino y territorio. A propósito del Vinalopó. In *I Congreso de Estudios del Vinalopó (Petrer, 1997)*, pp. 17-34. Petrer: Centre d'Estudis Locals.
- HERNÁNDEZ, M.S., P. FERRER & E. CATALÁ. 1988. *Arte rupestre en Alicante*. Alicante: Banco Exterior.
- JUAN, J. & B. MARTÍ. 2002. Poblamiento y procesos culturales en la Península Ibérica del VII al V milenio a. C. *Saguntum*, Extra 5, pp. 45-87.
- MANEN, C.
- 2000. Implantation de faciès d'origine italienne au Néolithique ancien: l'exemple des sites liguriens du Languedoc. In *Rencontres meridionales de Préhistoire récente. Troisième session*, pp. 35-42. Toulouse: Éditions Archives d'Écologie Préhistorique.
- 2002. Structure et identité des styles céramiques du Néo-

- lithique ancien entre Rhône et Ebre. *Gallia Préhistoire* 44: 121-165.  
<<http://dx.doi.org/10.3406/galip.2002.2033>>.
- 2007. La production céramique de Pont de Roque-Haute: Synthèse et comparations. In *Pont de Roque-Haute. Nouveaux regards sur la néolithisation de la France Méditerranéenne*, J. Guilaine et al., pp. 151-166. Toulouse: Archives d'Écologie Préhistorique.
- MARTÍ, B. & M.S. HERNÁNDEZ. 1988. *Neolític valencià. Art rupestre i cultura material*. Valencia: Diputació de Valencia.
- MARTÍ, B. & J. JUAN.
- 1987. *El Neolític Valencià. Els primers agricultors i ramaders*. Valencia: Diputació de Valencia.
- 1997. Epipaleolíticos y neolíticos: población y territorio en el proceso de neolitización de la Península Ibérica. *Espacio, Tiempo y Forma*. Serie I, 10: 215-264.
- MARTÍNEZ, C. 1994. Nueva datación de C-14 para el Neolítico de Murcia: Los Abrigos del Pozo (Calasparra). *Trabajos de Prehistoria* 51(1): 157-161
- MAZURIÉ, K. 2003. *Genèse et diffusion de l'agriculture en Europe*. Paris: Ed. Errance.
- MESTRES, J. 1992. Neolitització i territori. In *Estat de la investigació sobre el Neolític a Catalunya, 9è Col·loqui Internacional d'Arqueologia de Puigcerdà (1991)*, ed. M. Cura-Morera, pp. 72-75. Andorra: Institut d'Estudis Ceretans.
- MOLINA, F.J. 2001. Nuevas aportaciones al estudio del poblamiento durante el Neolítico I en el área oriental de las comarcas de l'Alcoià y El Comtat (Alicante). *Recerques del Museu d'Alcoi* 11-12: 27-56. <<http://www.raco.cat/index.php/RecerquesMuseuAlcoi/article/viewFile/175579/227930>>.
- PRICE, T.D. 2003. The arrival of agriculture in Europe as seen from the North. In *Migrations in prehistory. The Neolithic Transition in Europe: Looking Back, Looking Forward*, ed. R.H. Thompson, pp. 273-294. Boston: Academic Institute of Archaeology.
- PRICE, T.D., R.A. BENTLEY, J. LUNING, D. GRONENBORG & J. WAHL. 2001. Prehistoric human migration in the Linearbandkeramik of Central Europe. *Antiquity* 75: 593-603. <<http://antiquity.ac.uk/ant/075/Ant0750593.htm>>.
- ROJO-GUERRA, M.A., M. KUNST, R. GARRIDO & I. GARCÍA. 2006. La neolitización de la Meseta Norte a la luz del C-14: análisis de 47 dataciones absolutas inéditas de dos yacimientos domésticos del Valle de Ambrona, Soria, España. *Archivo de Prehistoria Levantina* 26: 39-100. <<http://www.museuprehistoriavalencia.es/resources/files/APL/APL26/APL26.pdf>>.
- ROSSER, P. 2007. *Tossal de les Basses. Seis mil años de historia de Alicante*. Alicante: COPHIAM.
- SALMERÓN, J. 1999. La cueva-sima de La Serreta (Cieza). Santuario de arte rupestre, hábitat neolítico y refugio tardorromano. *Memorias de Arqueología* 8: 140-154. <<http://www.arqueomurcia.com/archivos/publicaciones/memo08/09SERRET.PDF>>.
- SARMIENTO, G. 1992. *Las primeras sociedades jerárquicas*. Colección Científica 246. México: INAM.
- SOLER, J. & J.A. LÓPEZ. 2001. Nuevos datos sobre el poblamiento entre el Neolítico y la Edad del Bronce en el sur de Alicante. *Lucentum* XIX-XX: 7-26. <<http://publicaciones.ua.es/filespublici/pdf/02132338RD11518500.pdf>>.
- TORREGROSA, P. 2001. Pintura rupestre esquemática y territorio: análisis de su distribución espacial en el Levante peninsular. *Lucentum* XIX-XX: 39-64. <<http://publicaciones.ua.es/filespublici/pdf/02132338RD16296182.pdf>>.
- TORREGROSA, P. & F. GALIANA. 2001. El arte esquemático del Levante peninsular: una aproximación a su dimensión temporal. *Millars, Espai i Història* 24: 153-198.
- TORREGROSA, P. & E. LÓPEZ, EDS. 2004. *La Cova Sant Martí (Agost, Alicante)*. Alicante: MARQ.
- VARGAS, I. 1988. La formación económico-social tribal. *Boletín de Antropología Americana* 15: 15-27.
- WILLIGEN, S. VAN. 2004. Aspects culturels de la néolithisation en Méditerranée occidentale: le Cardial e l'Epicardial. *Bulletin de la Société Préhistorique Française* 101(3): 463-495. <<http://dx.doi.org/10.3406/bspf.2004.13028>>.
- ZILHÃO, J. 2001. Radiocarbon evidence for maritime pioneer colonization at the origins of farming in west Mediterranean Europe. *Proceedings of the National Academy of Sciences* 98(24): 14180-14185. <<http://dx.doi.org/10.1073/pnas.241522898>>.
- ZVELEBIL, M. 2000. The social context of the agricultural transition in Europe. In *Archaeogenetics: DNA and the Population Prehistory of Europe*, eds. C. Renfrew & K. Boyle, pp. 57-79. Cambridge: McDonald Institute for Archaeological Research.
- ZVELEBIL, M. & M. LILLIE. 2000. *Transition to agriculture in eastern Europe*. In *Europe's First Farmers*, ed. T.D. Price, pp. 47-92. Cambridge: Cambridge University Press.