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Article outline

ELUSIVE MESOLITHIC OCCUPATIONS IN THE PONT-GLAS ROCK SHELTER:

an Analysis of the Spatial Segmentation
of Production Sequences in Relation
to the Mobility of Prehistoric Groups in Brittany

Grégor MARCHAND, Michel LE GOFFIC, Nancy MARCOUX

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ELUSIVE MESOLITHIC OCCUPATIONS IN THE PONT-GLAS ROCK SHELTER:

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Abstract

The Pont-Glas rock shelter (Plounéour-Ménez, Finistère), composed of granitic blocks, was entirely excavated in 2007 and 2008. Its stratigraphic sequence is 50 cm thick and shows clear disturbances in the upper levels. Composed of 998 elements, its lithic assemblage includes an early component (8th millennium BC) and a late component (6th millennium BC). Several factors differentiate this assemblage from others in Brittany, including diverse raw materials, the absence of the first phases of debitage, the importation of cores, abundant weapon elements and a high rate of destruction of these objects. These elements are characteristic of short occupations and debitage activities responding to immediate needs, mostly devoted to the repairing of hunting or war weapons. An anthracological analysis shows that the nearby vegetal environment was composed mainly of acidophilus oak groves with holly, which is typical of the western Armorican massif. This logistical station attests to the presence of human groups specialized in the use of weapons and engaged in actions with the intention to kill. The need to camp and to repair their weapons indicates that they circulated well beyond their usual procurement zone.

Keywords

Brittany, Final Mesolithic, Second Mesolithic, Teviecian, rock shelter.

1 - Give us small sites!

1.1 - Research objectives

Due to their relatively high archaeological visibility, the shell middens of the Brittany coast and the hundreds of surface sites found in the inland zones of the Finistère have until now been the object of all studies concerning the Mesolithic. In most cases, these sites consist of regularly occupied habitats covering a vast surface area. However, the sedimentary deposits following human occupations are rarely sufficient to allow us to unravel the repeated occupations. As our knowledge of this period increases, the limits of these archaeological contexts become less and less tolerable: how can we evaluate the occupation of space by nomads when the data that could inform us concerning their mobility patterns and specialized activities are lacking? The Pont-Glas rock shelter at Plounéour-Ménez, entirely excavated in 2007 and 2008, has finally yielded information that could provide new elements of response to this question.

1.2 - Research progress

First concentrated on the coastline, research on the Mesolithic has migrated toward the inland zones of the peninsula, gradually during the 1980's and then with great strides during the 1990's. The discovery of the vast surface site of Drennec at Commana by M. Le Goffic (Le Goffic, 1990, 1994) (Finistère) and the surveys conducted by J.-M. Moullec in proximity to Huelgoat (Finistère) played a major role in demonstrating that Mesolithic occupations were not confined to the coastal margins. Following numerous surveys conducted under the direction of P. Gouletquer during the 1990's (Gouletquer *et al.*, 1994, 1996), it became clear that the most common Mesolithic occupation type at the extremity of the Armorican peninsula was an open-air habitat, rather than a shell midden. The results of these projects led to the development of spatial models of occupation based on studies of raw material economy (Yven, 2002, 2003; Marchand, 2005a), but the manners in which the stones had been dispersed were still poorly known. Ruptures in the *chaînes opératoires* ("operational sequence", roughly equivalent to a "reduction sequence") within an occupation, which reflect the activities realized in or outside of the camp, were never observable due to the poor definition of the archaeological assemblages. The test pits made at these sites yielded no preserved archaeological levels, and thus no structures (figure 1; Marchand, 2005b, 2009). In addition, it appears that surface scatters of lithic remains in a field most often correspond to a completely mixed underlying level. An absence of flint in this case indicates an even higher degree of erosion, or sometimes a clear sedimentary truncation, rather than the original limits of the habitat. It thus became necessary to reorient our field research goals toward a search for more homogeneous sedimentary ensembles in different contexts.

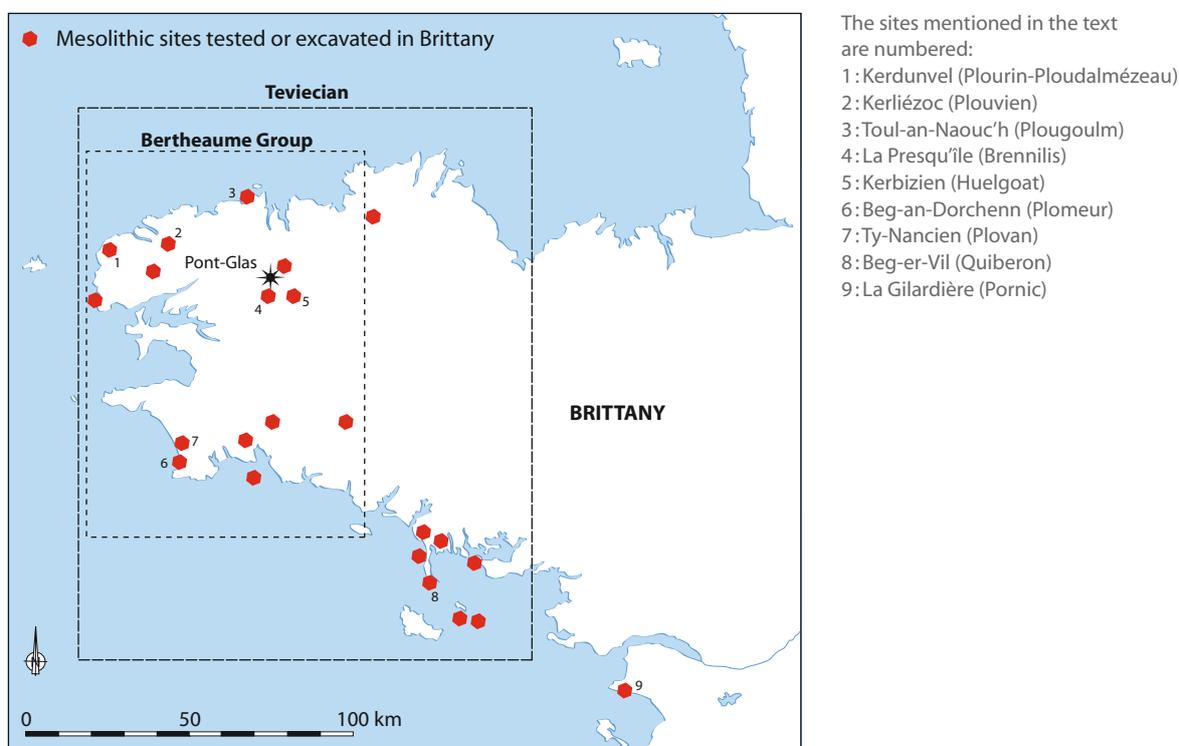


Figure 1 - Location of the Pont-Glas rock shelter and other Mesolithic sites tested or excavated in Brittany. Two stylistic entities were identified in the western part of this region: the Bertheaume during the 8500-7500 BC interval and the Teviecian between 6100 and 5300. The early component of Pont-Glas appears to correspond to an intermediary phase, hypothetically dated to the 8th millennium (CAD: Gr. Marchand).

1.3 - The “land/sea” model: a new framework of research

For Brittany in the 6th millennium BC, the record includes two types of fundamentally different yet complementary data:

- four shell middens on the southern coast, which yielded a broad range of information due to the good preservation of organic remains in carbonate rich sediments;
- sites without shells, in the open-air or less often in rock shelters, in which the acidic sediments destroyed the faunal remains but not the vegetal remains (charcoal and pollen), and which yield a broad range of lithic materials unique to the Armorican massif that can contribute to our understanding of mobility patterns.

This dichotomy, which is primarily linked to the geological context, can mask a double prehistoric reality. It appears that two opposed economic systems existed during this period, one based on the exploitation of an apparently rich coastal shoreline, the other focused on the hunting of terrestrial resources inland from the peninsula. This hypothesis is based on results obtained in three different analysis domains:

- lithic raw material procurement territories;
- in the inland procurement territories, the stones transformed into tools were composed of at least 50% flint, while stones from the inland zones (microquartzite, phtanite, ultramylonite, cataclasite) have never been found at the large coastal sites. It thus appears that the raw materials circulated through exchanges between these zones rather than by periodic migrations of a group (in which case, we would find ultramylonites or phtanites in the shell middens, at least in the form of tools);
- the strong proportion of proteins of a marine origin in the skeletons of the necropolises of Tévéc and Hoëdic (respectively 50% and 80%) suggest there was a great stability in the coastal occupations (Schulting and Richards, 2001; Schulting, 2003);
- seasonality analyses based on the growth rings of clams and the capture dates of other animal species leave open the possibility of sedentary or semi-sedentary occupations of the shell middens (Dupont, 2006; Dupont *et al.*, 2009, 2010).

According to the model that we will test in the coming years through fieldwork, known as the “land/sea model”, the coastal shoreline would have been permanently occupied with large, long-term occupation sites and small logistical stations, while the inland zone would have been traversed by more mobile groups with an economic organization that remains to be fully defined.

2 - Archaeological context of the Pont-Glas rock shelter

2.1 - Under the protection of chaos

The zone of low hills in the center of which the rock shelter is located is clearly distinct from the schist and sandstone hills of the Monts d'Arrée immediately to the south (figure 2), as well as the loess plateaus that extend to the north until the ocean (23 km away). The erosion of the monzonitic porphyreous granite of Commana-Plouaret gave rise to a very particular landscape composed of countless granite spheres, solitary or in chaotic arrangements. Due to the destruction caused by ancient quarries and modern mechanized agricultural practices, many have disappeared; the relatively good preservation of the Pont-Glas shelter can be attributed to its current isolation in the woods and its round blocks, which are poorly adapted to knapping.

The protected zone, covering a surface of approximately 15 m², is delimited by inclined and overlapping granite blocks (figure 3). The rock shelter is open to the east under a 2 m high ceiling and to the west by a second entrance, 1.4 m high (figure 4). Originally, the main entrance was partially closed by a third block, thus facilitating the installation of a ceiling made of a perishable material, but this block was cut by the quarries. During the Mesolithic, the rock shelter thus had a roughly triangular form with 5 to 6 m long sides (figure 5). It was discovered and tested in 1987 by Michel Le Goffic, before being fully excavated in 2007 and 2008. In the context of this excavation, all of the sediments were water sieved with a fine mesh in order to recover all remains. This is one of the greatest interests of this site and the approach presented in this paper.

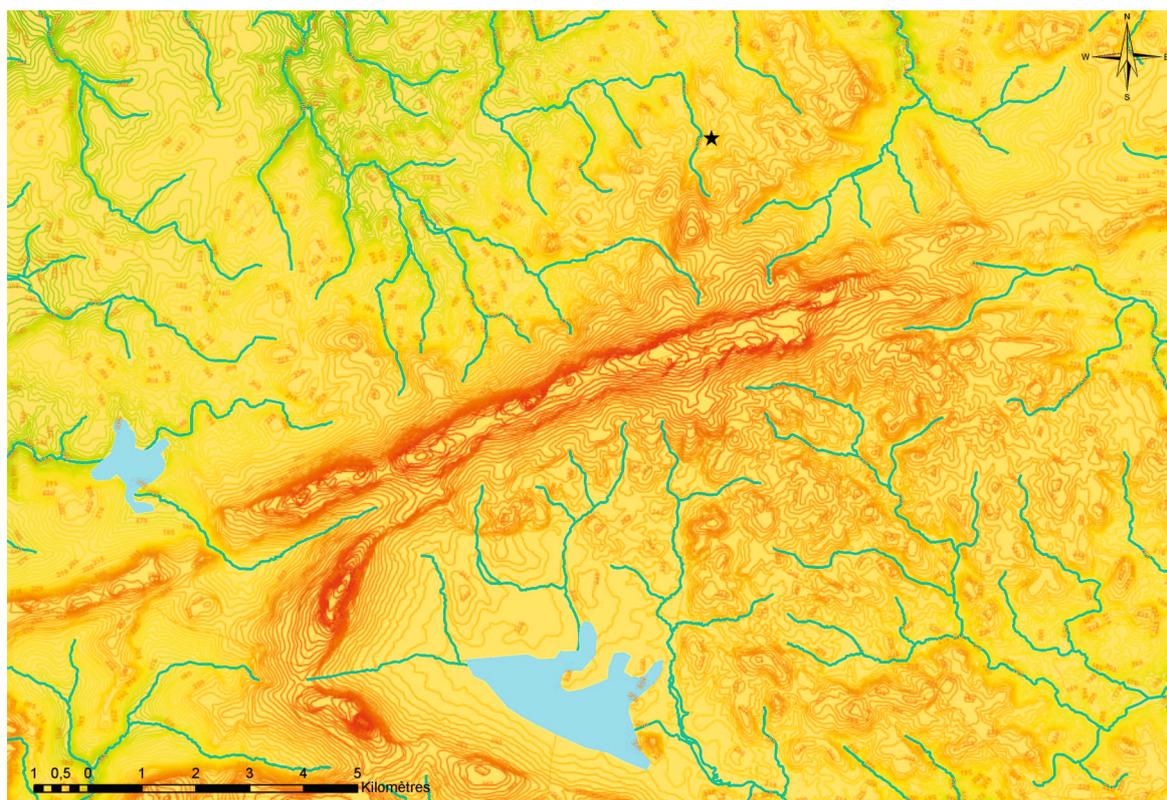


Figure 2 - The Pont-Glas rock shelter is located in a piedmont zone to the north of the Monts-d'Arrée (CAD:Y. Bougio).

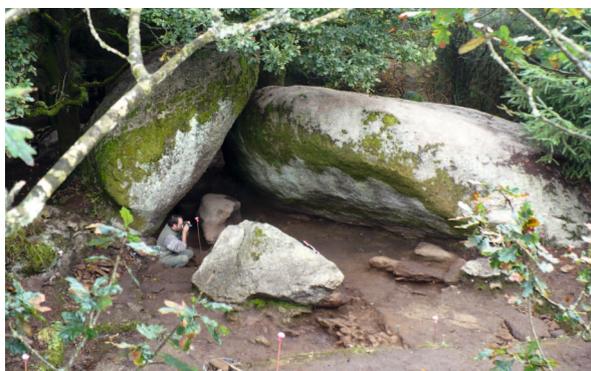


Figure 3 - Eastern entrance of the rock shelter and view at the end of the excavation of the cavity. Block 3 in the foreground was cut by the quarry, probably in modern times (photograph: C. Graindorge).



Figure 4 - The western entrance of the rock shelter is relatively inconvenient due to its low height and a block in the middle. It does not appear to have been used and there are very few Mesolithic and Latenian remains in front (photograph: Gr. Marchand).

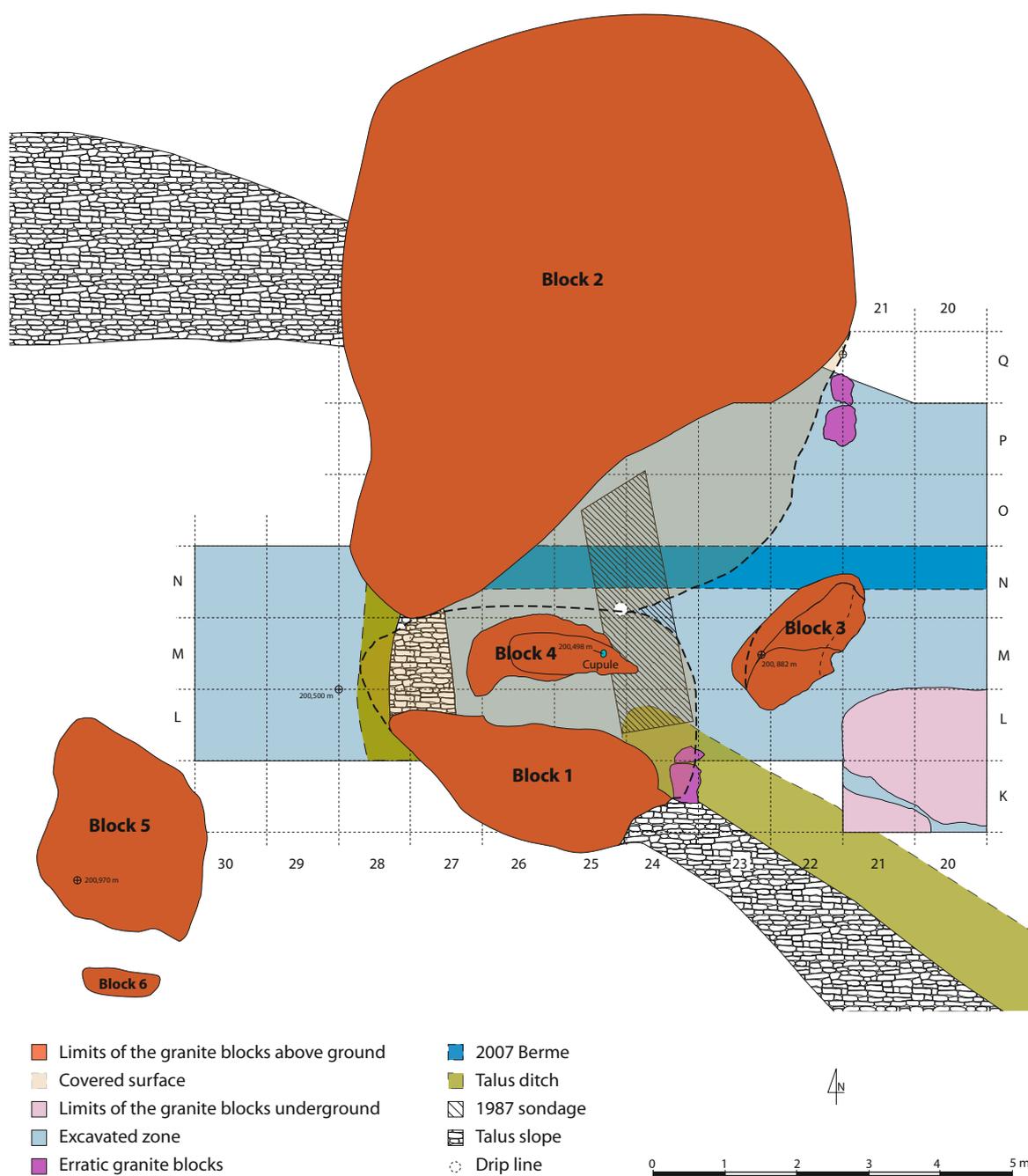


Figure 5 - Plan of Pont-Glas and the 1987-2007-2008 excavations, with the main structural elements (recording and CAD: Gr. Marchand).

2.2 - Stratigraphy and spatial organization

The stratigraphy of the rock shelter is relatively simple. From top to bottom, in a thickness of 50 cm, we find (figures 6-7):

- a dry litter and a humus level (US 1);
- a level with many burned stones outside and in the eastern entrance of the rock shelter (US2);
- a group of levels with an arenaceous matrix (US 5 and 6);
- the more or less dislocated and disintegrated bedrock (US 3, 4 and 5.9).



Figure 6 - View of the rock shelter in the process of excavation. The central berm displays remains at the level of the stones dated to the La Tène period (US 2), while the arenaceous levels of the Mesolithic were excavated on both sides (photograph: Gr. Marchand).

The difference in nature between the upper silty layers (US 1 and 2) and the underlying arenaceous layers is not due to a change in sedimentation, but is totally natural in a rapidly evolving polycyclic soil, such as that in the rock shelter. The organic materials are highly altered in Horizon B, which today corresponds to the lower Mesolithic levels. If we globally consider the results obtained during the two years of excavation, it is clear that the remains of several periods are mixed within the stratigraphic units, except for US “5.3 lower” US 5.6 and US 5.9, which contain only lithic artifacts. The lithic materials thus are present in all the levels and attest to numerous disturbances by burrowing animals. A large Early La Tène occupation in US 1 and 2, including utilitarian pottery and at least two beautifully decorated vases, is puzzling in such a small rock shelter. A constructed hearth and a flat hearth overlying it both appear to date to this period. The only prehistoric “feature” consists of a zone in which small vertical plaques of the bedrock were trampled, indicating a long human presence in the area of the rock shelter that is best adapted to occupation (figures 8-9).

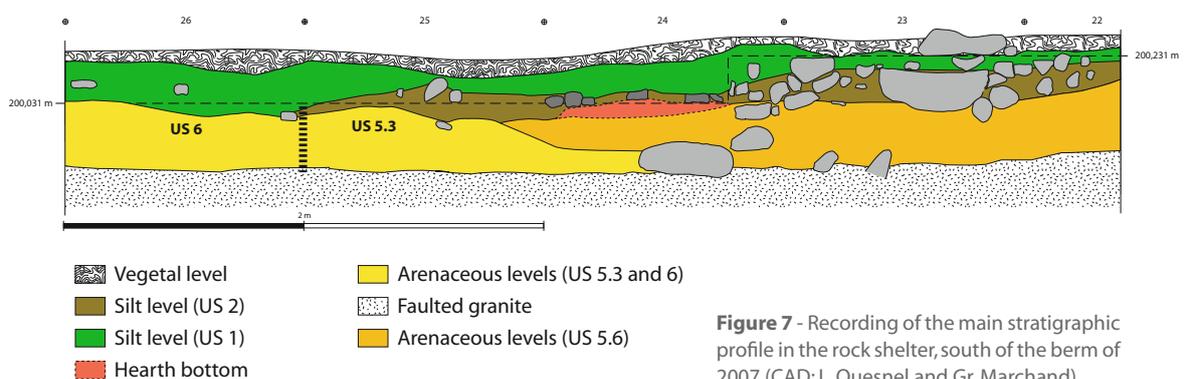


Figure 7 - Recording of the main stratigraphic profile in the rock shelter, south of the berm of 2007 (CAD: L. Quesnel and Gr. Marchand).

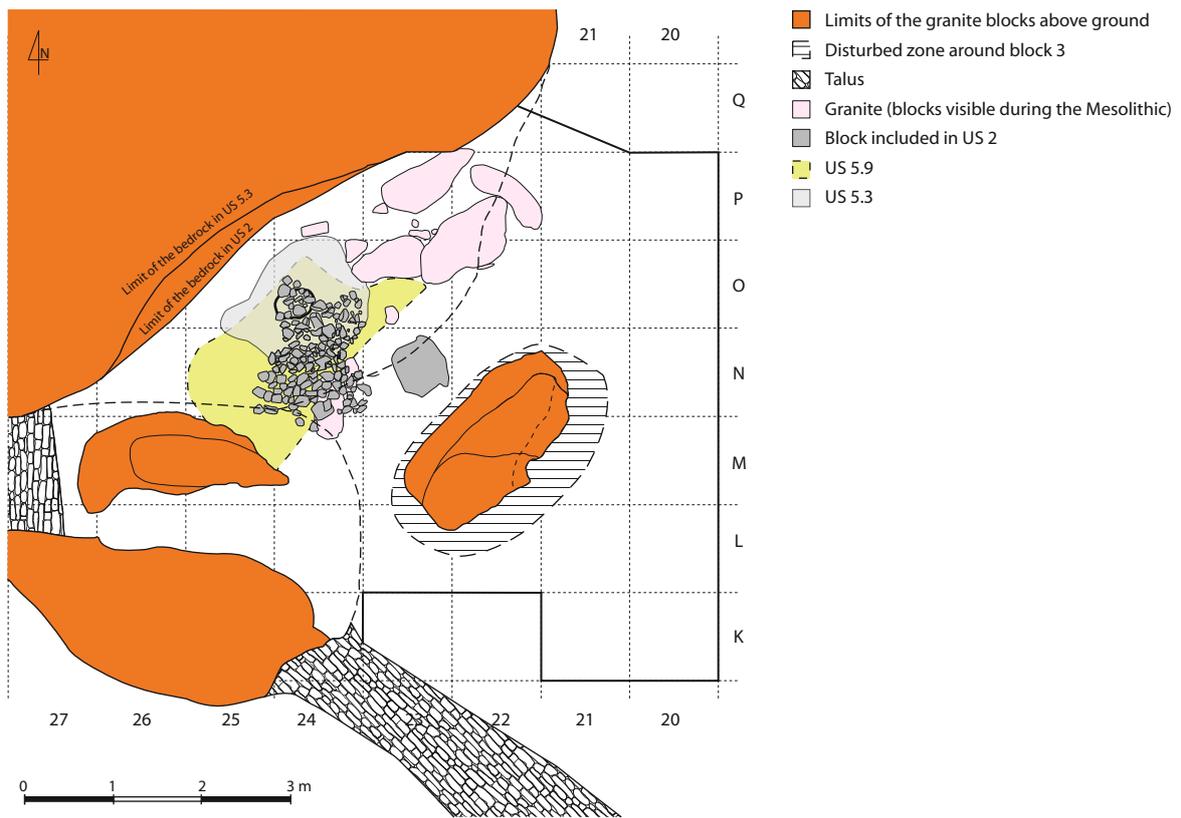


Figure 8 - Superposition of the two Latean combustion features and the trampled level of the modified bedrock (US 5.9), showing the limitations of such a space (CAD: Gr. Marchand).



Figure 9 - View of the trampled zone of the bedrock under Block 2, in the location of the highest lithic artifact density (photograph: Gr. Marchand).

2.3 - Dating the prehistoric occupations

The entire lithic industry is composed of 998 objects, or 649 without the chips. Most of the objects made from fine-grained stones are attributable to the Mesolithic, even if there is a slight indication of a Neolithic component (a small flake with a chalky cortex and a fusiform borer). There is an Early Mesolithic component, which is relatively rare in the first Mesolithic of the region. It includes the narrow scalene triangle / point with a retouched base / backed bladelet trilogy, to which we are tempted to add a microquartzite pick, which is a totally new tool type in the region. In the Paris Basin, this type of assemblage would be dated to the 8th millennium BC, and would thus occur after the development of the Berthaume group, whose best local reference is Toul an Naouc'h at Plougoulm (Kayser *et al.*, 1990).

The second component has the greatest number of weapon elements and incontestably corresponds to the Final Mesolithic, and specifically the Teviecian of the Beg-er-Vil facies. These two phases are slightly disjointed in space (figure 10), as well as in stratigraphy, as strange as this may seem in this context. The early component (points with a concave base and scalene triangles) is found almost exclusively in the lower arenaceous US's (US 5), while the trapezes of the late component are mainly found in the upper silty and highly disturbed US's (US 1 and 2). This hint of a stratigraphy must be interpreted with caution as the date obtained at the base of the site definitely corresponds to the Final Mesolithic (6400 ± 50 BP, or 5480 to 5300 BC - Beta-253526). It is probable that during this period, the disturbances had already affected the earlier remains. We propose the hypothesis that in such a limited space, the occupations were forcibly located in the same zones. This "inertia" would thus be represented by the slight dispersion of the lithic artifacts despite the numerous disturbances.



Figure 10 - Spatial distribution of the weapon elements, classed into three groups (early component, late component, undetermined weapon elements (CAD: Gr. Marchand).

3 - The function of the site within an economic network

3.1 - The nature of the lithic record

The taphonomic conditions of this site were not favorable to the preservation of usewear; sedimentary micro-polish is abundant and the edges of the pieces are systematically worn. In order to qualify the activities realized in this rock shelter, we must therefore identify other parameters whose representivity we will discuss. In effect, none of them can be interpreted in isolation, but must be compared with sites with a controlled sample in identical cultural contexts in order to reveal the inconsistencies that could indicate specific functional statuses.

The assemblage is dominated by flint originating from coastal cobbles (44%), though their proportion is low relative to that at other sites in the Brittany inland zone. It is followed by micro-quartzites (21%), Eocene sandstones (10%) and Mikaël cataclasites (9%). There are a few traces of “du Clos” chalcedony, phtanite and Tréméven ultramyylonite. The diversity of the facies of each of these stones in this small assemblage indicates repeated occupations by human groups, leaving only a few elements each time. There is no technical logic in the selection of these stones; some, such as the Tréméven ultramyylonite, despite its mediocre quality, arrived from a distance of more than 50 km in the form of two thin flakes. While procurement diversity is standard in the Mesolithic of central Brittany, it attains its apogee at Pont-Glas with a procurement zone that extended over a range of more than 50 km (figure 11). It suggests a circulation of individuals rather than exchanges of unworked blocks, in which case we would have more debitage by-products in the rock-shelter.

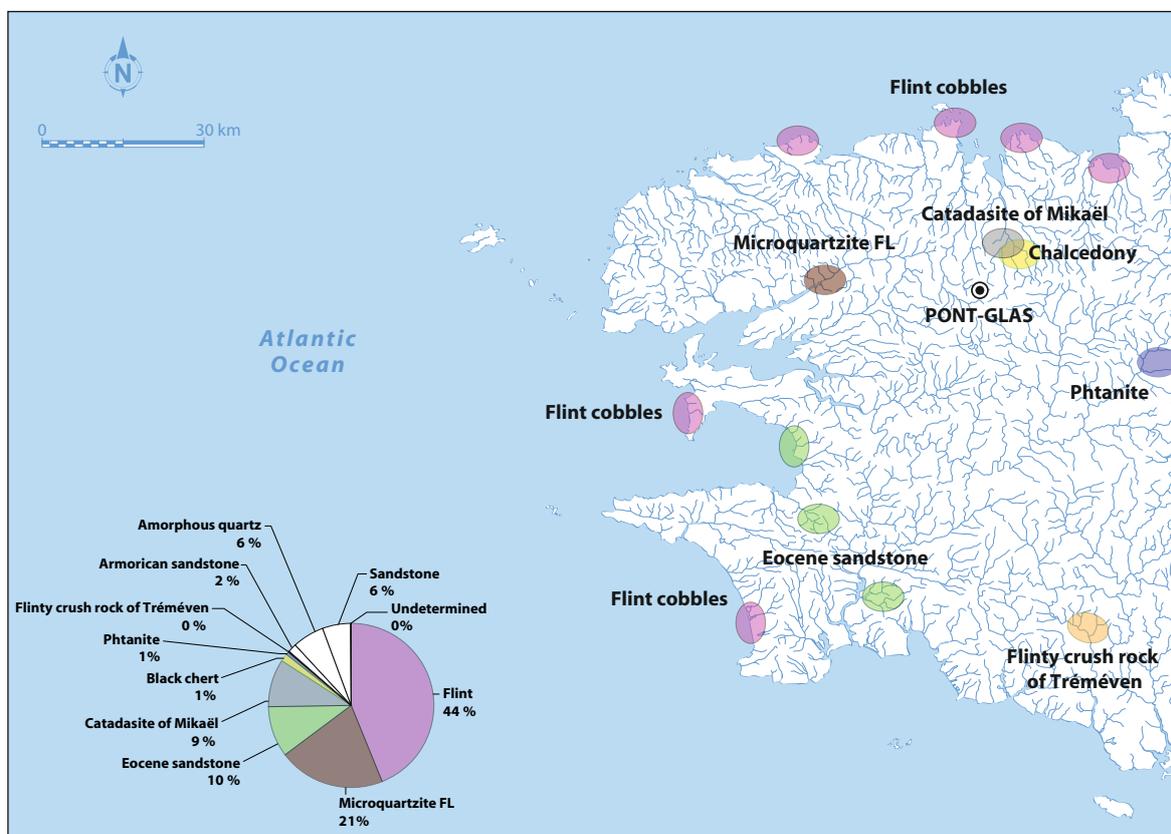


Figure 11 - Origins of the knapped stone materials at Pont-Glas (CAD: Gr. Marchand).

If we consider only flint objects (since the other stones have no true cortex), we observe that there are no initial preparation removals and very few products from the early reduction phases. Cortical flakes thus represent 17% of the whole flakes, versus 31% in the shell midden of Beg-er-Vil (Quiberon, Morbihan – Marchand, 1999). This proportion reaches 23% at Pont-Glas if we add the semi-cortical flakes, versus 56% at the site of Morbihan, or 44% at Beg-an-Dorchenn (Plomeur, Finistère). Measuring only 8 to 20 mm long, these flakes more likely correspond to a middle phase of core reduction than to a true initialization phase. They almost certainly originate from small residual cortical zones on blocks that arrived to the site after being prepared elsewhere. Blades and bladelets represent 35% and 25% of the whole pieces and proximal fragments, while the two together represent only 12% at Beg-er-Vil. With only three cores in flint and two in Mikaël cataclasite, it is clear that blocks in the process of reduction were often exported away from the site. The two extremities of the *chaînes opératoires* are thus greatly underrepresented, while the production of elongated elements and flakes without cortex was clearly dominant, thus suggesting a production “on demand”.

The domination of weapon elements in the tool assemblage is one of the key elements for interpreting this technical distortion (figure 12). The proportion of 67% is well above the values recorded elsewhere in the region (table 1) and can be similar only to La Gilardière (Pornic, Loire-Atlantique), where it reaches 49%. At this small site at the top of a cliff, the *chaînes opératoires* were clearly oriented toward the production of bladelets, in particular for the fabrication of weapon elements (Marchand, 1999). At Pont-Glas, it appears that the manufacturing of these thin, non-cortical objects was also the main objective of the debitage activities, in both the early and late phases of the occupations. A significant number of these armatures have impact fractures (13 out of 42), in particular the symmetric trapezes hafted as arrowheads. In addition to these arrow repairing activities, there exists a wide range of other activities that require the use of sharp edges. In such a context, we evidently think of tasks related to butchery, but it is unfortunately these activities that leave the most tenuous traces on tool edges and the taphonomic conditions at Pont-Glas probably obliterated them. Nevertheless, with 3.1% of the unworked and retouched pieces (other than chips), the proportion of transformed tools – which intentionally disregards the *a posteriori* tools – is the lowest in our corpus of sites.

Table 1 - Proportion of burned pieces (burned pieces/total) and weapon elements (weapon elements/total of modified tools) at the three sites excavated and attributed to the Second Mesolithic of western France. For the sites of Presqu'île and Kerliézoc, the collections originating from surface collections in planigraphy and sondages (from a sieving of the shore in the first site) are distinguished.

Site name	Burned pieces	Weapon elements	Bibliography
Pont-Glas (Plounéour-Ménez, Finistère)	17,7 (26,5 silex)	67,7	Marchand, Le Goffic, 2009
La Presqu'île (Brennilis, Finistère) – Planigraphy	34,4 (silex)	35,5	Marchand, 2005b
La Presqu'île (Brennilis, Finistère) – Shore 2001	-	62,0	Marchand, 2005b
Kerliézoc (Plouvien, Finistère) – Sondages 2001	13,0 (silex)	56,0	Josselin <i>et al.</i> , 2003
Kerliézoc (Plouvien, Finistère) – Planigraphy 1999	8,4 (silex)	46,7	
Kerdunvel (Plourin-Ploudalmézeau, Finistère) – Sondages 2003	25,7	47,6	Marchand, 2005b
Beg-an-Dorchenn (Plomeur, Finistère)	22,6	46,8	Rault, 1992
Ty-Nancien (Plovan, Finistère)	24	57,3	Tsobgou Ahoupe, 2007
Beg-er-Vil (Quiberon, Morbihan)	35,2	50,0	Marchand, 1999
La Gilardière (Préfailles, Loire-Atlantique)	23,2	77,4	Marchand, 1999
L'Essart (Poitiers, Vienne)	85,4 (22,2 pieces + 63,2 cassons)	29,0	Marchand <i>et al.</i> , 2007

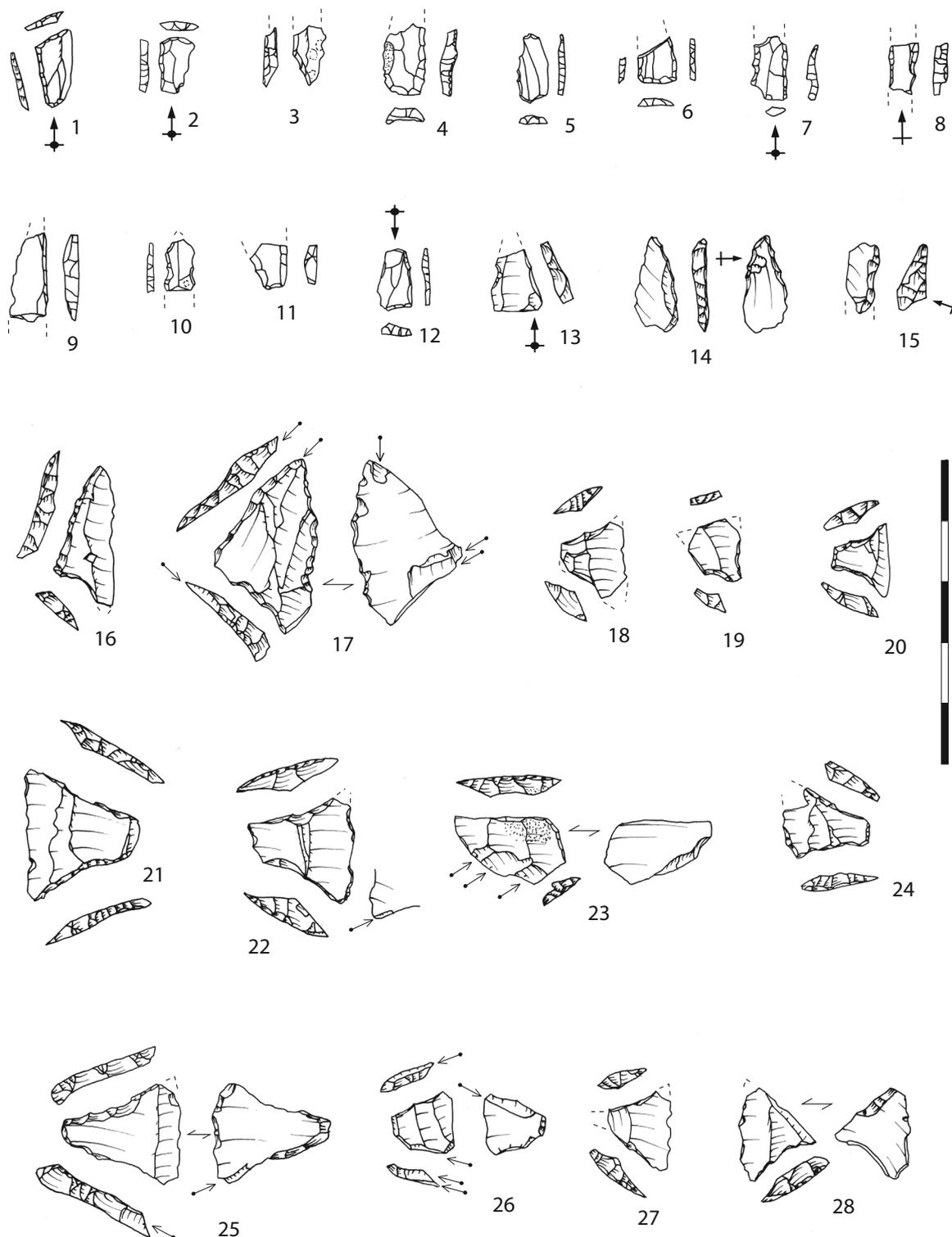


Figure 12 - Weapon elements of Pont-Glas. 1, 2, 3: narrow scalene triangles; 4, 5, 6, 12: points with a retouched base; 7, 8, 9, 10: backed bladelet fragments; 11: undetermined weapon element; 13, 14: points with an oblique truncation; 15: weapon element with a pseudo-microburin fracture of the Krukowski type; 16, 17: wide scalene triangles; 18 to 27: asymmetric trapezes; 28: trapezoidal bitruncation classed with the trapezes (Flint: 1, 3, 4, 6, 7, 8, 9, 10, 15, 16, 17, 20 à 28 ; GE: 2, 5, 12, 13, 14; FL: 11; CT: 18, 19) (Drawings: Gr. Marchand).

Heat treatment does not appear to be an extremely convincing diagnostic criterion, even if due to irreversible nature we could theoretically assume that the longer the occupation, the higher the proportion of pieces affected by fire or heat. In this case, the Protohistoric hearths are probably responsible for some of these modifications. The number of burned pieces is relatively low (18% of the total) relative to what we find at other Mesolithic sites attributed to the 6th millennium (table 1). Meanwhile, metamorphic stones, already originating from a fusion, do not suffer thermal shocks in the same manner. If we consider only flint, this proportion reaches 26%, which is comparable to the estimations made at other sites in the Finistère region, such as the Beg-an-Dorchenn shell midden or the open-air sites of Kerdunvel (Plourin-Ploudalmézeau) and Ty-Nancien (Plovan).

3.2 - Finally, a discordant site type in the coastal and continental zones

The diversity of lithic raw materials and their facies, the relative rarity of the first phases of debitage, the exportation of cores, the abundance of weapon elements and the high rate of damage to these pieces are all characteristics that distinguish this assemblage from others in the Finistère region. The relatively low concentration lithic artifacts (33 / m² inside the rock shelter, throughout a thickness of 50 cm) and the small surface area of the space, delimited by the stone walls, clearly suggest short-term occupations. We must nevertheless remember that these occupations occurred at different times throughout at least two millennia and there is no indication that the function of the rock shelter was always the same. What we describe, therefore, is forcibly a mean profile of the site. But is this not true at other sites as well? The shell middens and large open-air sites were also formed over several centuries, with probable changes in site function. These functions would thus have to be highly visible and recurrent for us to be able to perceive them through the multiple taphonomic prisms that alter our perception.

The particular segmentation of the *chaînes opératoires* and the abundance of weapon elements lead us to conclude that the Pont-Glas rock shelter was repeatedly occupied by small groups of hunters or warriors who moved across the entire western zone of the Armorican peninsula. This type of short-term, specialized occupation implies the existence of a complementary long-term occupation, integrated within a mobility strategy that was more logistic than residential. These statements of the obvious do not get us very far, however, without further research to identify the “base camps” or “main sites”. The open-air site of Presqu’île (Brennilis), located 10 km to the south of Pont-Glas, beyond the hills of the Monts-d’Arrée, could be a good candidate for this role since it yielded a similar range of stone raw materials and weapon element types (Marchand, 2005 a-b). This vast spread of artifacts nonetheless originates from an intensive degradation by wave actions of a barrier lake, thus preventing us from estimating the proportions of the different sequences of the *chaînes opératoires*. The same is true for the large occupations discovered through surveys, whether on the low terraces of the Aulne Valley or in the small valleys of the northern Finistère. The shell middens in southern Brittany should be eliminated, on the other hand, since to date no stone originating from the inland zone has been found and they do not function in a preferential manner with the hinterland sites.

4 - The forest way of life

An analysis of the wood charcoal found at Pont-Glas shows that the environment near the site was mainly composed of acidophilous oak groves with holly, which is a typical forest formation of the western Armorican massif during this period (Morzadec-Kerfourn, 1974; Marguerie, 1992; Gaudin, 2004; figure 13). Oak (*Quercus* sp.), probably a mixture of the pedunculate (*Q. robur* L.) and

sessile (*Q. petraea* [Mattus.] Liebl.) types, is the dominant species (figures 14-15). It is accompanied by small fruit trees (pomoids of the hearth-shaped pear [*Pyrus cordata* Desv.] and mountain ash [*Sorbus aucuparia* L.]), holly (*Ilex aquifolium* L.) and yew (*Taxus baccata* L.).

The presence of species native to other types of environments nevertheless shows the mosaic nature of this landscape. Wild cherry (*Prunus avium* L.) and hazelnut (*Corylus avellana* L.) are found in richer zones at the slope bases or valley bottoms. These zones, though they had a permanent water supply, were favored by alder (*Alnus* sp.), which colonized the banks of watercourses and humid woods. Finally, alder buckthorn (*Frangula alnus* Mill.) and broom (*Fabaceae* of the *Cytisus scoparius* type (L.) Link), which need much light, indicate the presence of open zones. The range of taxa observed in the charcoal therefore reveals the diversity of the wood procurement zones. It appears that the occupants of the rock shelter at least partially selected their woods. This hypothesis is supported by the observation of charred woods with a worked appearance (concave and convex rounded parts and notches), which are probably the remains of weapons or other domestic objects that were heated with fire. The recurring observation of small wood with a final ring composed only of initial wood suggests that the site was occupied in spring.

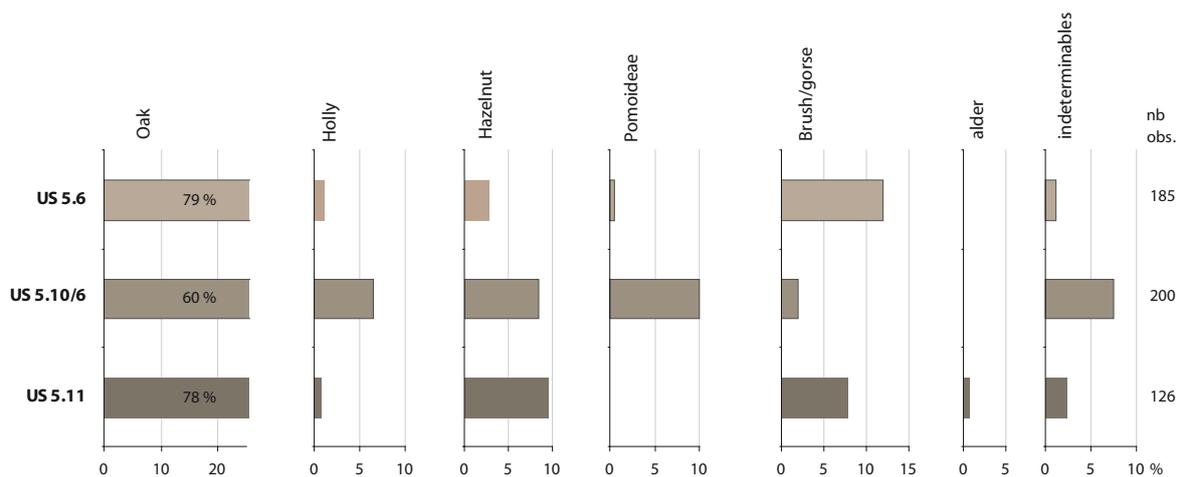


Figure 13 - Anthracological diagram of the site of Pont-Glas: frequency of the observations of the different stratigraphic units (CAD: N. Marcoux).

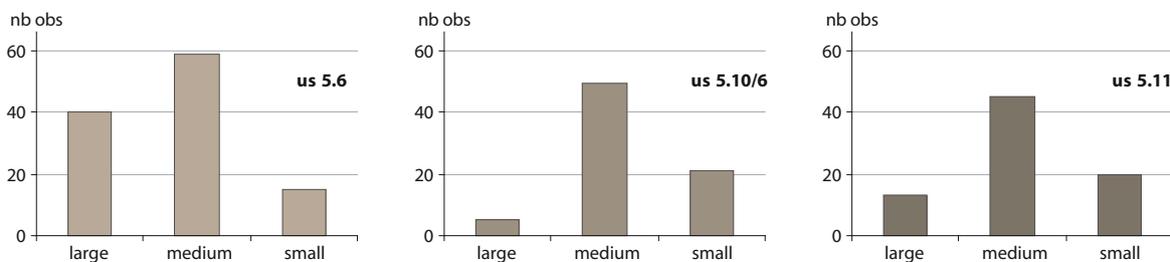


Figure 14 - Sizes of the oaks of the three stratigraphic units. The three US's include large oak pieces, corresponding to trunks or large branches. US 5.11 and US 5.10/6 have a smaller quantity of large oaks and also include medium-sized ones. US 5.6 contains a high proportion of large oak pieces, and the medium and small sizes in this US probably correspond to the internal parts of these large trunks or branches (CAD: N. Marcoux).

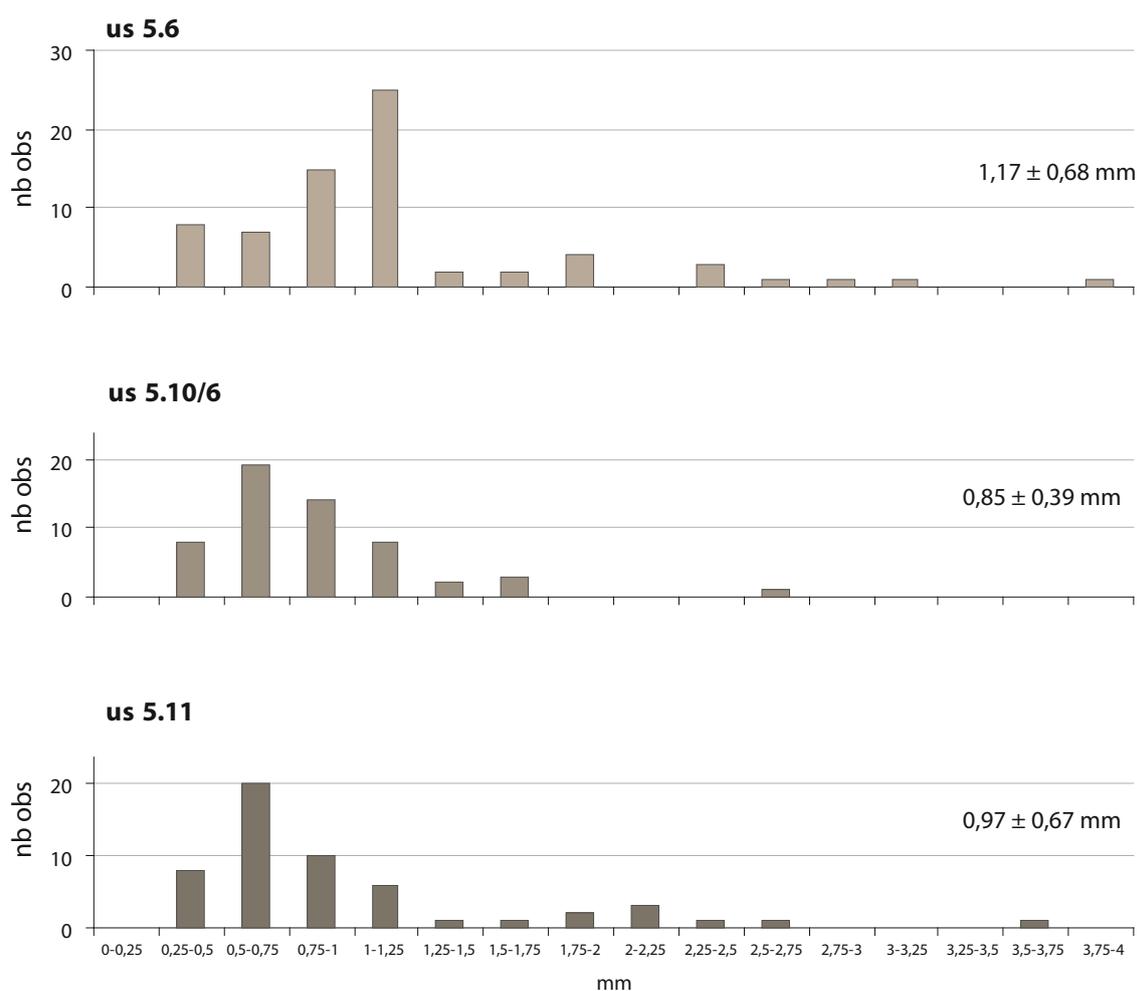


Figure 15 - Histograms of the width classes of the growth rings of the three stratigraphic units, averages and standard deviations. Most of these widths are concentrated around 1 mm; they correspond to very limited annual growth cycles, characteristic, for example, of trees evolving in a dense forest or senescent trees. A second group, concentrated around 2 mm, reflects better growth conditions. This bimodality is highly characteristic of the Armorican Mesolithic (CAD: N. Marcoux).

In the Armorican massif, only two sites contemporary with Pont-Glas have been the object of a recent anthracological study: Beg-an-Dorchenn (Plomeur, Finistère – Dupont *et al.*, 2010) and Beg-er-Vil (Quiberon, Morbihan – unpublished study by Yolanda Carrion Marco). Both are located on the coast (figures 16-17). On all three sites, oak is the dominant taxon, though to an even greater degree at Pont-Glas. On the coast, pomoids are well represented, accompanied by prunoids (*Prunus* sp.) at Beg-an-Dorchenn. At Tévéc, Marthe and Saint-Just Péquart also observed a dominance of oaks, as well as pomoids of the pear type and alder buckthorn (Péquart, 1929). As at Beg-er-Vil, they also noted the presence of pears and carbonized seeds that they attributed to hearth-shaped pears (*Pyrus cordata* Desv.). At Hoëdic, the results of analyses were lost in transport, but the excavators again recall the presence of alder buckthorn and broom (Péquart, 1954). All of this is concordant with Pont-Glas (especially 5.6 and 5.10/6), but holly and yew are specific to Pont-Glas, in relation to its location in the continental zone. Future analyses of other sites of this period will aid in the interpretation of these still scarce results.

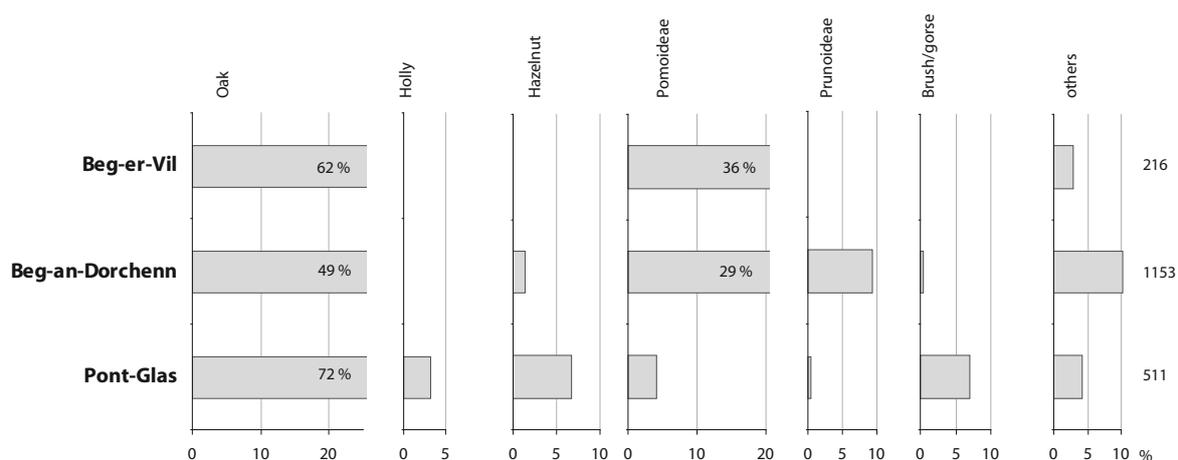


Figure 16 - Anthracological diagram of the Mesolithic sites of the Armorican massif (CAD: N. Marcoux).

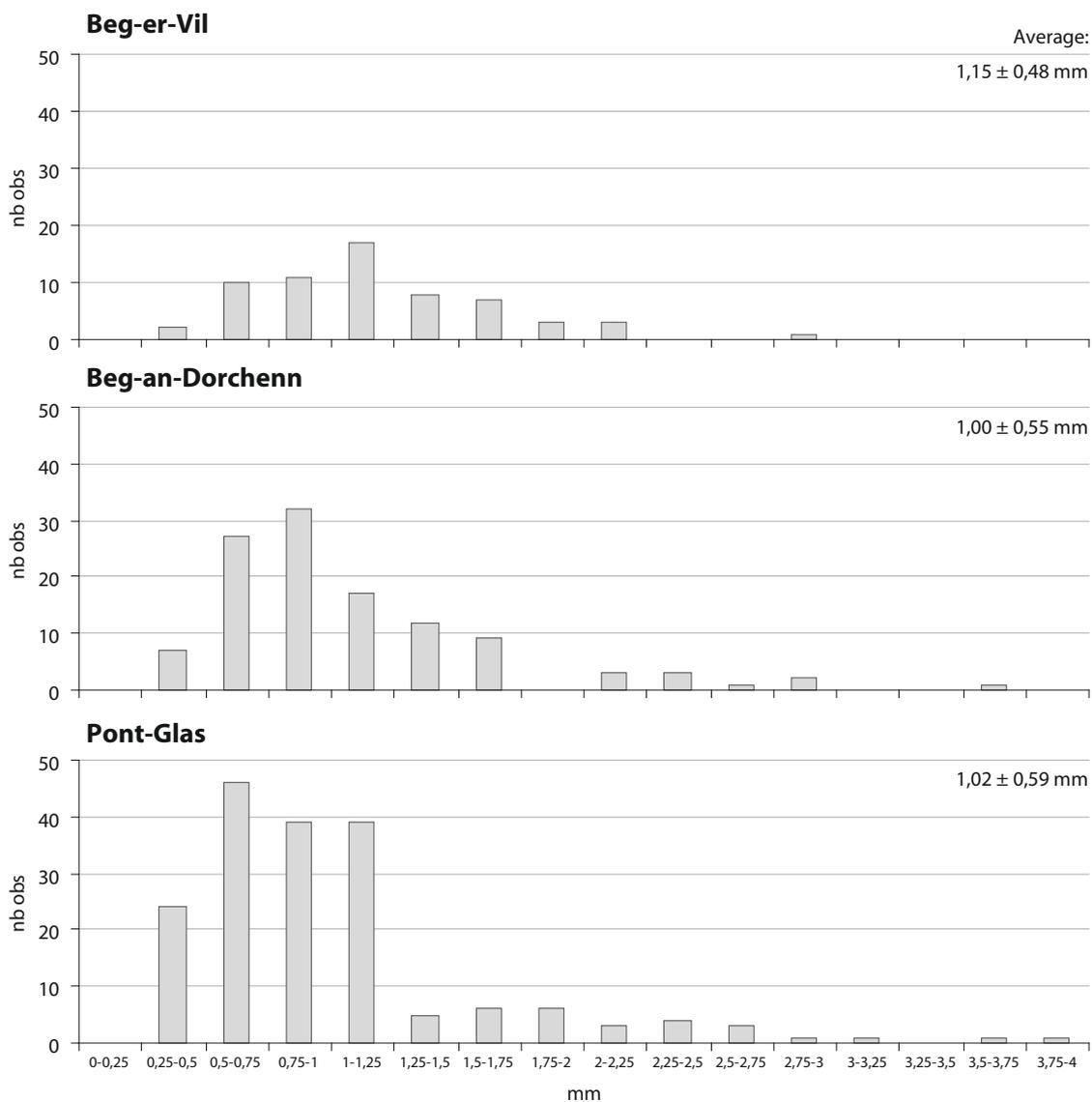


Figure 17 - Histograms of the width classes of the growth rings of oaks in Mesolithic sites, averages and standard deviations. The average width of the annual growth rings of oaks is approximately the same at the three sites, though it is slightly higher at Beg-er-Vil. These values, close to 1 mm per year, are very low and reveal strong growth constraints. These histograms also include values of 2 mm and greater, reaching values indicating free growth (4 mm) (CAD: N. Marcoux).

5 - Halt, bivouac, camp, station...

Unlike previous archaeological endeavors, the excavations of the Pont-Glas rock shelter have shed new light on human occupation strategies in central Brittany during the Mesolithic period (figure 18). In this zone, we cannot depend on osseous remains to provide information on the economic practices of hunter-gatherers. In addition, the low sedimentation rate of a shelter under granite blocks does not favor the complete preservation of its occupations. By focusing on lithic artifacts, and in particular, on the segmentation of *chaînes opératoires* in space in relation to the

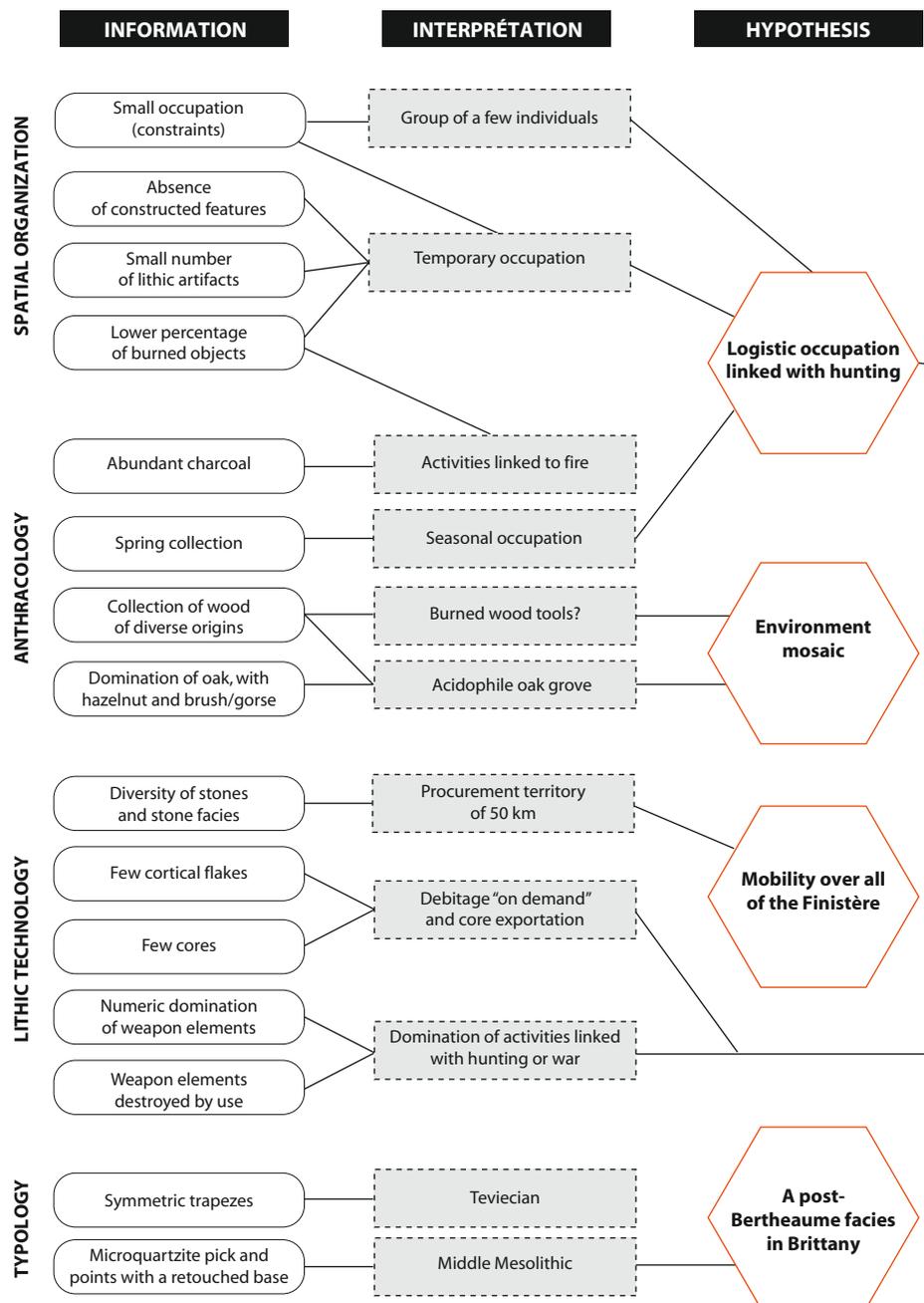


Figure 18 - Scheme illustrating process of interpretation of the data from Pont-Glas; the range of information is classed into broad categories (Conception and CAD: Gr. Marchand).

movements of human groups, it is nonetheless possible to at least partly overcome these geological limitations. Anthracology also plays an essential role in such an enquiry as it can allow us to distinguish the basic characteristics of a forest and can provide indications concerning the season of occupation, at least the spring season, which is the one that interests us here.

How can we qualify this type of occupation? It is pointless in these contexts to cling to the term “hunting camp” since the purpose of such occupations is at best conjectural. Moreover, the notion of hunting covers too many different actions and site types to be of any help, especially in the Armorican sedimentary contexts, which severely blur our vision (Marchand *et al.*, this volume). At Pont-Glas, we find evidence of restricted human groups specialized in the manipulation of weapons and engaged in actions intended to kill. The necessity to camp and to repair their arrows indicates that they circulated well beyond their base camp and usual procurement zone. We believe that the term “logistical station” covers all the information and limitations presented here, while integrating this occupation within a mobility strategy involving a few large occupations that have certainly already been identified, but remain to be defined.

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