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**EARLY MODERN HUMANS AND THE MARINE ENVIRONMENT
[THE IBEROMAUROSIAN]**

Article 8

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EARLY MODERN HUMANS AND THE MARINE ENVIRONMENT [THE IBEROMAUROSIAN]

ABSTRACT

[AR]

المجموعات البشرية الحديثة الأولى و البيئة البحرية (الإيرومغربي)

تظهر علاقة الإنسان بالبحر في العديد من الشواهد الأثرية لفترة ما قبل التاريخ في شمال إفريقيا خاصة في الجزائر، ونجد من بين أهم حضارات ما قبل التاريخ الحضارة الإيرومغربية، يهدف هذا المقال إلى فهم سلوك المجموعات البشرية الإيرومغربية في محيطها وعلاقتها مع المحيط البحري، وكذلك تبيين التراث الأثري المغمور تحت مياه البحر. فقد شهدت المناطق الساحلية في شمال إفريقيا تغيرات مع مرور الوقت مما أدى إلى تغير مظهرهم، على سبيل المثال بسبب تقلبات مستوى سطح البحر، فقد غمرت المياه بعض المواقع التي أقيمت بجانب البحر قبل الهولوسان والتي يمكن أن تشهد علاقة السكان الساحليين الأوائل بالبحر مثل المغرب. يعود الوجه الثقافي الإيرومغربي إلى العصر الحجري القديم الأعلى، يؤرخ ما بين 22000 إلى 10000 ق.ح ويمتد على سواحل بلاد المغرب من شمال تونس إلى جنوب المغرب الأقصى. يرتبط بالإنسان العاقل القريب جدًا من Cro-Magnon، فهناك منه مجموعتان: مشقى أفالو ويتمثل بالشكل الخشن، والمشتاوي الذي يمتاز بالشكل النحيف. تعد المناطق الساحلية غنية بالكتلة الحيوية وتوفر موارد غذائية وفيرة ويمكن الوصول إليها بسهولة، لهذا السبب، قد كانت بالفعل مناطق جذابة للإيرومغربيين؛ لذلك يتركز مكان استيطانهم على الساحل حيث يستقر الإنسان غالبًا في ملاجئ تحت الصخر والمغارات، لكنهم استوطنوا أيضًا في الهواء الطلق على مستوى المناطق الداخلية. توفر الوديان والحافة الساحلية للبحر الأبيض المتوسط على وجه الخصوص المواد الأولية، وتوفر الممرات والأماكن الاستراتيجية لإقامة القاطنين والصيادين خلال البلايستوسان الأعلى.

[EN] The relationship of human and marine environments appear in many archaeological testimonies of prehistoric North Africa; this is seen especially in Algeria, one of the most important civilizations we find the *Iberomaurusian*. This paper aims to understand *Iberomaurusian* humans behavior in their environment and their relationship with the marine environment, therefore promoting underwater archaeological heritage. The coastal areas of North Africa have undergone major changes over time, which changed their appearance. Some of these changes include sea level fluctuations, during which sites that were established by the sea before the Holocene. These sites, like the Maghreb, bear witness to the relationship of the first inhabitants of the coast with the sea, and were submerged. *Iberomaurusian* is a prehistoric culture that dates back to the Upper Paleolithic, between 22 to 9,5 ka cal BP. It extends on the coasts of the Maghreb from northern Tunisia to southern Morocco, and housed *Homo sapiens*, who were genetically very close to Cro-Magnon. There are two groups of *homo sapiens*: Mechta-Afalou, the robust form, and Mechtoid, the slender form. Coastal regions are rich in biomass and offer abundant and easily accessible food resources, and they were already, for this reason, attractive areas for the *Iberomaurusian*. Habitations of the *Iberomaurusian* concentrate on the coast where humans often settled in caves and rock shelters. Coastal borders of the Mediterranean provide, in particular, raw materials, offer mobility paths, strategic places to set up hunters-gatherers of the Late Pleistocene.

KEYWORDS: Algeria, coastal borders, *Iberomaurusian*, marine environment, North Africa, subsistence.

I. INTRODUCTION

The coastal areas of North Africa have undergone major changes over time, which changed their appearance. For example, due to sea level fluctuations, settlement sites by the sea, which were established before the Holocene, were submerged like Tunisia. Moreover, the sea is an important source of nutrients. The closed Mediterranean basin does not present favorable conditions for the development of marine fauna, and according to biological and archaeological data, some fauna from prehistoric periods are identical to current fish and shells, which are contemporaneous to the *Iberomaurusian* culture. This research is aimed at investigating the relationship between the *Iberomaurusian* of North Africa and the marine environment. Our study is closely connected to maritime environments, and focuses on *Iberomaurusian* culture that often relied on coastal resources. This culture was involved in maritime activities such as fishing, collecting marine mollusks or shellfish harvesting. *Iberomaurusian* groups had navigation skills, and they fished sea bream that live in the coastal seabed. Until now, there is no clear evidence that shows that the *Iberomaurusian* of North Africa knew navigation outside of North Africa. Meanwhile in the Capsian, there is the presence of obsidian stone artifacts and striker reindeer wood. During the Neolithic period, the primary evidence that draws attention are archaeological remains, such as the remnants of printed and cardinal pottery, and the obsidian material that spread during the Neolithic period in the Tellian regions of the Maghreb. Probably, the obsidian was brought by Neolithic human groups to the Maghreb from Iberian Island (in the west) and from the islands of south Italy (in the east). The similarity in the remains distinguishes the neighboring countries of Egypt, Italy and Spain, which explains that there is a relationship among the prehistorical human groups. The essential arguments likely to prove the existence of any nautical activity in North African Prehistory comes from the marine environment. But we do have not direct evidence of preserved remains of boats or safe and well-dated iconographic representations¹.

The *Iberomaurusian* groups were hunter-gatherers. Also, they lived in diverse environments, both inland and along the coastal territories. We will, first of all, identify the different biotopes available, which were revealed by aquatic taxa from Algerian *Iberomaurusian* assemblages. It will thus be possible to determine the exploitation zones of these environments and to present examples of their exploitation. This study will be enriched by the examination of fish and mollusks remains from *Iberomaurusian* sites.

II. MATERIAL AND METHODS

Once aquatic territories are described, it is easier to estimate the type and degree of their exploitation by human communities, or in other words to outline the extent of human influence. It is obvious that the location of the sites in relation to the physical territories in question is not sufficient on its own to explain what is happening. We subsequently analyze and interpret human territories in a marine environment using GIS (Geographic Information Systems) as a tool. The approach, «Site catchment analysis», has been executed in this study, which focuses on hunter-gatherer economies and site resource bases for part of the Algerian region as a model. This approach relates

¹ ONRUBIA-PINTATO 2012: 1.

to the study of spatial connections in archaeology, and has usually been used in archaeological studies². This approach was founded by the researcher Chisholm³ and was developed by researchers Vita-Finzi and Higgs according to requirements and the special features of archaeology. They defined this theory as the study of the relationship between technology and those natural resources represented in the economic zone neighboring the site⁴. GIS has become an efficient tool to implement predictive models and simulations in archaeology including the site catchment analysis⁵.

We have explored ArcGIS for spatial repartition and analysis, and applied the buffer methods into main *Iberomaurusian* sites in this study in order to analyze the distance of *Iberomaurusian* sites from the seashore (near or far from archaeological sites). For the transportation of marine resources, we relied on «least-cost analysis» to reconstruct mobility patterns and procurement strategies for mollusks resources in west Algeria.

We used the data provided by the first authors and discoverers of *Iberomaurusian* sites, particularly for the marine remains of fish, mollusks and crustaceans⁶, We have included our experiences in archaeological surveys of the Algerian coastlie, like Sidi Said, which is under the direction of Y. Saoudi and N. Saoudi in 2008. Our experience in archaeological excavations such as at Rachgoun site, which is under the direction of M. Betrouni in 2017, our moving from the Rachgoun site to the sea (Madrid Beach) by foot, helped us to understand the mobility of *Iberomaurusian* humans. Further, our visiting Taforalt and its surrounding area, such as Zegzel in 2019, during the First Congress of Geological and Archaeological Heritage (CPGA1, University Mouhamed Premier Oujda), has let us to know the territory of the iberomaurusian in this region of Morocco, this visit is under the direction of A. Bouzouggar and EL H. Talebi. We use our⁷ study and analysis of *Iberomaurusian* stone artefacts of Taza I, and we exploited our⁸ analysis of prehistoric human settlement in the region of Tiaret Mountains too (south-Oranais). We did many archaeological surveys at Columnata and its surrounding area in order to understand prehistorical human behaviors. The recent studies are also used to understand marine malacofauna exploitation by the *Iberomaurusian* groups of the Alain rockshelter, specifically of Oran and Taza I of Jijel in the Babors region.

III. IBEROMAURUSIAN CULTURE

Many researchers have been interested in the *Iberomaurusian* culture, which is a prehistorical culture belonging to the epipaleolithic. This culture was first named by Paul Pallary in 1909⁹ after the tools that were found in La Mouillah, a site near

² ROOD 1982: 28.

³ CHISHOLM 1968: 113

⁴ VITA-FINZI & HIGGS 1970: 5.

⁵ SAVAGE 1991: 331

⁶ Such as PALLARY, P. 1909 ; BARBIN, P. 1910 & 1912 ; CADENAT, P. 1948 ; BALOUT, L. 1958 ; CAMPS, G. 1974 ; Camps-Fabrer, E. 1975. In addition, we have included studies by recent authors: Campmas, E. et al 2016; MERZOUG, S. 2017; MERZOUG, S. et al 2022.

⁷ CHABANE 2012: 281.

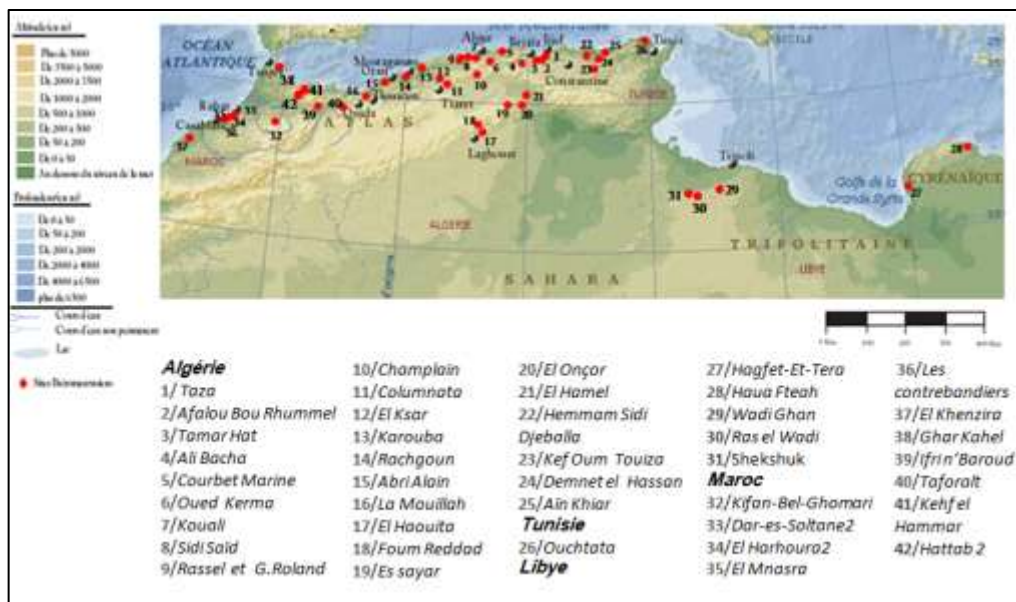
⁸ CHABANE 2022: 925.

⁹ BRAHIMI 1968: 5; TIXIER 1963: 10.

Maghnia west Algerian.¹⁰ He attributed the Ibero name to Spain, believing that it had cultural contact and communication with the Iberian Upper Paleolithic.

The *Iberomaurusian* existed in North Africa during the Late Pleistocene, 22 and 9.5 ka cal BP.¹¹ This period appears towards the end of the second Heinrich event and developed throughout the Late Glacial in Northern Europe. It correlates broadly with the northern European Younger Dryas. This Upper Paleolithic culture is mostly divided into two subphases: an Early and Late *Iberomaurusian*¹². This period developed under a relatively cold and dry climate¹³.

North Africa hosts numerous *Iberomaurusian* sites [FIGURE 1]. Notable locations in Algeria include La Mouillah, Afalou Bou Rhummel, Taza, Zemmouri El Bahri, and Tamerhat, the oldest known site in Algeria¹⁴. Additionally, El Anzor, dating back to 8100 BP (GIF.44.33), predates El Haouita, El Hamel, and Columnata. In Morocco, there are the following sites: Tafouralt, Harhoura, El Khenzira, and Ouchetata. There is also Hawa Fteeh in Tunisia, Hagfa Tira in Libya, and Nazlet Khater-4 in Egypt¹⁵. Outside of Africa, there is the site of Ksar Akil in Lebanon, which is located near Beirut, in the layer (B3). It contains shells and microlithics, dominated by backed bladelets¹⁶.



[FIGURE 1]: Site distribution and land use of *Iberomaurusian* in the Maghreb. CHABANE 2012: 15, FIG.1

During this period, *Iberomaurusian* humans developed an industry characterized by distinctive bone and stone artifacts, setting them apart from previous periods. Paul Pallary defined the *Iberomaurusian* stone artifacts as microlithic backed bladelet industry¹⁷ what spread along the coastal areas¹⁸. To investigate the industrial complex of

¹⁰ CAMPS 1974: 57; BARTON et al. 2005: 59; BALLOUT 1958: 112-113; BARICHE et al. 2006: 563.

¹¹ CAMPAS et al. 2016: 83.

¹² LINSTÄDTER 2008: 45.

¹³ MERZOUG 2017: 190.

¹⁴ CLOSE 1984: 11-12.

¹⁵ VERMEERSCH et al. 1990: 444.

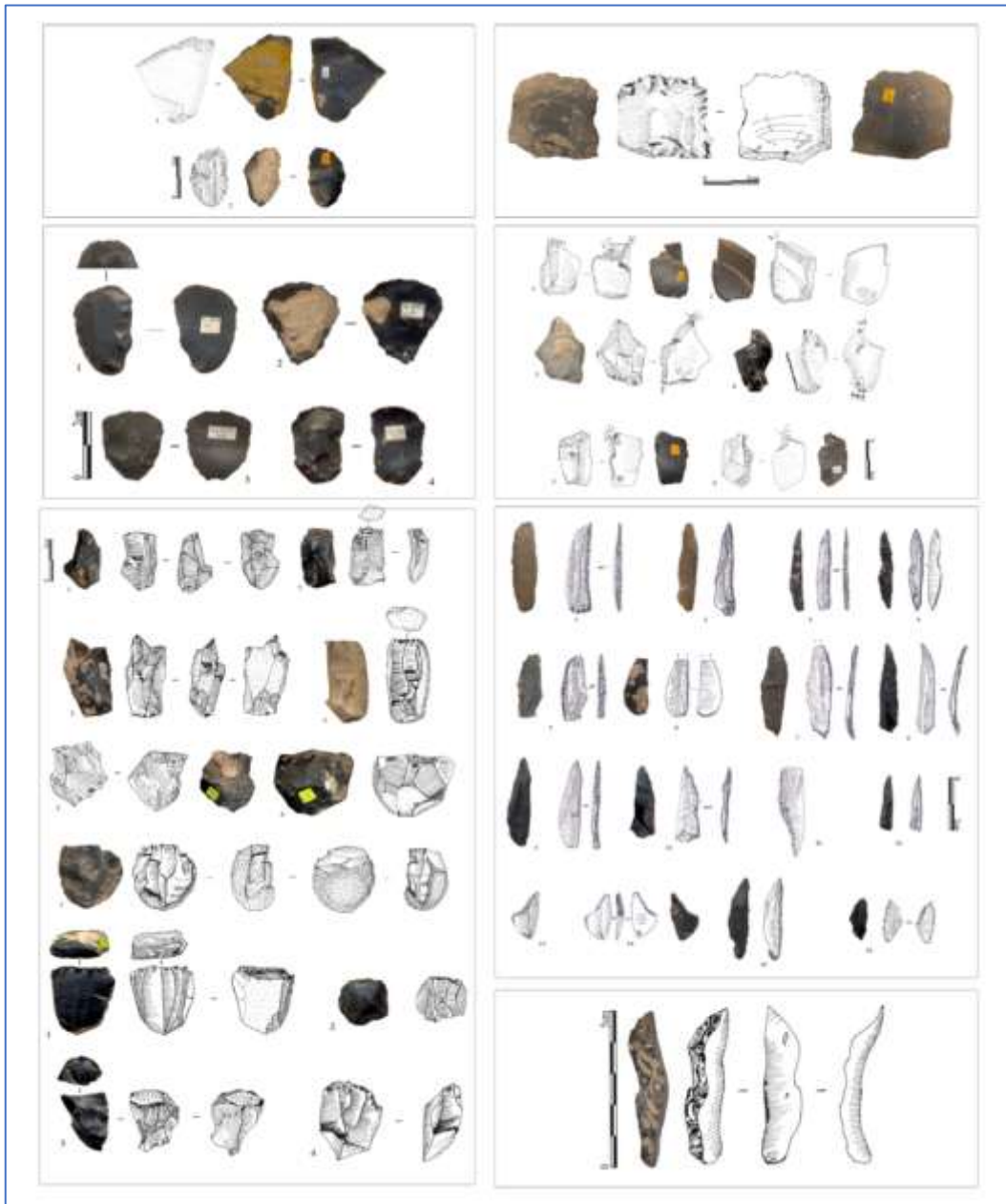
¹⁶ LUBELL 2004: 86.

¹⁷ BALLOUT 1958: 111.

¹⁸ BARTON et al. 2005: 79.

this culture, researcher Tixier provided a specific typological list in 1963, derived from the Maghreb region. This list, which includes 112 types distributed into 11 groups, serves as the primary model for attributing types within the Epipaleolithic period, to which the *Iberomaurusian* and Capsian cultures belong. An *Iberomaurusian* stone artifact is defined by its compact size and microlithic attributes, notably featuring crescent-backed bladelets¹⁹ alongside larger-sized pieces.

Its main products are the bladelet lithic industry²⁰. Small cores allow for the production of bladelets, and are distinguished by a skewed flat striking platform such as what is seen in Taza I cave²¹. These lithic cores are usually small pyramidal shapes. [FIGURES 2-3].



[FIGURE 2]: *Iberomaurusian* stone artifacts of Taza I site. CHABANE 2012: 15.

¹⁹ ROCHE 1963: 5.

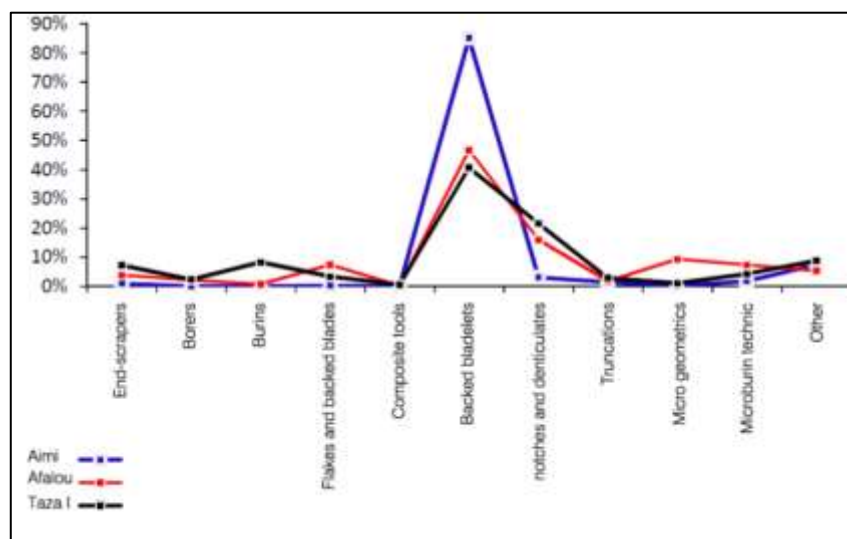
²⁰ CLOSE 1980: 154.

²¹ CHABANE 2012: 277.



[FIGURE 3]: Microlithic industry, bone industry, shells and red ochre of *Iberomaurusian* culture of Taza I © Photo taken by the author

In terms of debitage, the human maker prefers the extended shape because of their elegance and lightness²². In addition to the bladelets, we find blades and flakes. Stone tools are exceptionally rich and diversified, and this lithic industry contains a large percentage of backed bladelets tools [FIGURE 4]. The most notable one of backed bladelets tools is La Mouillah point²³ and truncations tools which were made with the microburin technique. There is also an abundance of scrapers which mostly are flakes, denticulates, burins and micro geometrics that are rare²⁴. The *Iberomaurusian* lithic industry characterized by the appearance of ouchtata retouche too²⁵. Various raw materials are used including flint, sandstone and quartzite²⁶. The *Iberomaurusian* lithic industry contains some sturdy tools such as hummer, grindinds or crushing tools, seen in the case of Dar-es-Soltan 2 site²⁷.



[FIGURE 4]: A graphical curve representing a comparison of the content stone artifacts of *Iberomaurusian* sites (Taza I, Afalou Bou Rhummel and Aimi). CHABANE 2012: 276, FIG.218.

²² GOBERT 1945: 448.

²³ TIXIER 1963: 106; STRAUS 2001: 98.

²⁴ SCHURMANS et al. 2006: 12.

²⁵ RODRIGUE 1994: 210.

²⁶ DERRADJI 2003: 49; LUBELL 2001: 138.

²⁷ NESPOULET & EL HADJRAOUI 2004: 89.

In addition, the presence of the bone industry among the *Iberomaurusian* is represented by bone tools and ornaments, which was identified by Camps-Fabrer in 1966. The bone industry contains only 27 of 54 types which are found in four groups. The first group is the cutter group, which were received in 06 types (slicers, knives and scissors). The second group include the polishers, the third group includes perceives and the forth group encompasses the ornaments, along with one type of pendant²⁸.

Bone tools were made with varying degrees of mastery. Some of the tools discovered at the Afalou Bou Rhummel site showed masterful technique, while other tools were prepared by burning with less precision. It seems like the Afalou human did not care about the perfection of their manufacture, as they still preserve the anatomical parts of animal bone [FIGURE 5].



[FIGURE 5]: *Iberomaurusian* bone industry of Columnata site © Photo taken by the researcher

Iberomaurusian graves are available, sometimes forming cemeteries. The most famous cemetery is Columnata that presented 110 individuals. Taforalt had 183 individuals, while Afalou Bou Rhummel at least 60 individuals²⁹. Furthermore Ifri n'Baroud is characterized by an individual burial³⁰. Bodies are placed in a variety of positions, such as sitting cross-legged, on the back, or lying down such as in the case of H28 of at Afalou Bou Rhummel. The squatting position is also observed at the Taforalt site. Funeral rituals were associated with some buried bodies (animal remains, body adornment, stone or bone tools and pieces of red ocher). *Iberomaurusian* inhabitants practiced tooth avulsion, or the removal of the upper incisors. This ritual is applied to the two upper incisors.³¹This phenomenon was practiced whether female or male³², teenager or child. The lower incisors were removed even if they are not used regularly³³. The concept of practicing this ritual remains ambiguous.

²⁸ CAMPS 1974: 67.

²⁹ HACHI 2006: 430.

³⁰ BEN-NCER 2004: 180.

³¹ CAMPS 1974: 97.

³² NESPOULET & EL HAJRAOUI 2004: 89.

³³ HADJOUS 2002: 338

Iberomaurusian made art throughout North Africa, which is characterized by small figurines made of pottery (baked clay). The Tamar Hat cave has many of these artistic examples. At this site, a piece of baked clay, dated to 20200 BP, was found and published by Saxon in 1973. The site also yielded two spherical sandstone pebbles, which were perforated and of large size³⁴. Similarly, Afalou Bou Rhummel is a site that contains the largest collection of objects made of pottery, some of which are piles of clay including spherical and sub-spherical shapes, but the majority of the clay pieces represent animal shapes and Anthropique shapes³⁵. Statues of Afalou Bou Rhummel concentrated in the layer VIII and IV, dated between 14910 ± 180 BP and 13120 ± 370 BP³⁶.

IV. IBEROMAURUSIAN HUMAN

The atherian human being disappears and the Mechta Afalou human type appears in the *Iberomaurusian* record³⁷. The name Mechta Afalou is derived from Mechta El Arbi, the archeological site where MERCIER & DEBRUGE (1907, 1912, 1914) found the first representative of this human genre, and Afalou Bou Rhummel, the site where a large number of human skeletons were found and allowed for VALLOIS & BOULE to identify more Mechta Afalou³⁸. This is a true homo sapiens³⁹, very close in shape and appearance to the cro-magnon⁴⁰, who appeared in Europe about 35000 years ago⁴¹.

There are two groups: the Mechta Afalou, who have a rough appearance, and the Mechtoid, who have a thin appearance or body⁴². The available evidence suggests that they were anatomically modern Homo sapiens, more than 500 individuals were found. According to Chamla, this human type contains the following physiological characteristics: A man's stature is estimated at 1.74 m and that of the woman is 1.63 m with a brain capacity estimated at 1650 cm³. The skull has a pentagonal shape from the upper view, and is long dolichocephal, mesocephal and disproportionate to the face. The facial shape is low, short, broad and generally thrust forward with a prominent nose. The orbits are far apart and have a rectangular shape, lowered and the lower jaw is sturdy.

The skeleton is rough and the bones are thick. The forearms and feet are long comparing to the humerus and thigh. Chamla showed that the Mechta Afalou species combines four subspecies, forming the evolution connections of this species. The oldest type has the longest «hyperdolichocephal» skull, which is seen in number 38 from Afalou Bou Rhummel. The Classical is characterized by long and a medium skulls, dolichocephal and mesocephal, which we find in Afalou Bou Rhummel and Taforalt.

³⁴ CAMPS-FABRER 1960: 105.

³⁵ HACHI 2003: 163.

³⁶ HACHI 2006: 431.

³⁷ HADJOUIS 2003: 7; HACHI 2006: 430; AOURAGHE 2006: 241.

³⁸ ARAMBOUR et al.1934: 64

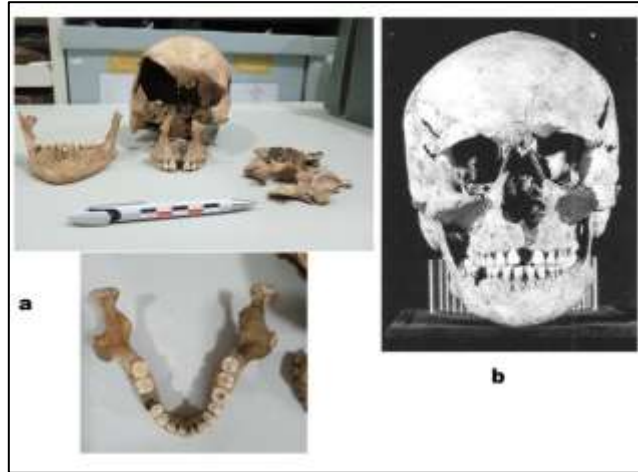
³⁹ DEBENATH 2000: 137; DERRADJI 2003: 52.

⁴⁰ IRISH 2000: 393.

⁴¹ AOURAGH 2006: 241.

⁴² LUBELL 2001: 138.

The evolved *iberomaurusian* is known as Mechtoid and has a less robust skull and small dimensions; this kind is found in Taforalt, Afalou Bou Rhummel and Columnata. The last type has a short skull, which correlates with brachycephal, is known in north Africa; it is autochthon and characterized by its slender shape. This type evolved locally and has been identified in Afalou Bou Rhummel and Columnata [FIGURE 6].



[FIGURE 6]: Human N^o.22 from the Columnata necropolis. CHAMLA 1994: 6. Modified by the researcher

V. HABITAT

Coastal regions are rich in biomass and offer abundant and easily accessible food resources. They were already, for this reason, attractive areas for the first hominids in different parts of the world⁴³. The *Iberomaurusian* almost completely occupied the coast⁴⁴, occupying caves and deep rockshelters. We also sometimes find them in exposed habitats. Mostly, they are common in sandy regions or territories which Balout spoke about «law of the sands»⁴⁵, like in fixed dunes.⁴⁶ Such sites include Rachgoun, El Khiar and Ouchtata. Or they live on stands of erosion, such as Le Musoir site, Courbet-Marine (the new noun is Zemmouri El Bahri), Demnet El Hassan and El Ksar site, cut out of alluvium where sand dominates. These habitats were built and shaped with branches and reeds, having left no visible structures in the archaeological layers⁴⁷. The thickness of archaeological layers in certain rockshelters and caves (Tamar Hat, Taforalt, Ténès, Taza I) reveals the sustainability of the occupation, which is confirmed, in at least three cases, in Taforalt, Afalou bou Rhummel and Haua Fteah. This is a chronological sequence covering several millenaries. On the basis of the large size of the sites, the depth of the deposits and the large number of burials discovered in certain sites, it seems that the *Iberomaurusian* lived in large groups. At least a few sites functioned like base campsites⁴⁸. There are also sites that are interpreted as seasonal fishing stations, such as cave of Taza I⁴⁹.

⁴³ ALVAREZ-FERNANDEZ 2015: 192.

⁴⁴ CAMPS 1974: 59.

⁴⁵ BALOUT 1955: 347.

⁴⁶ BARICHE et al. 2006: 568.

⁴⁷ Camps 1974: 91.

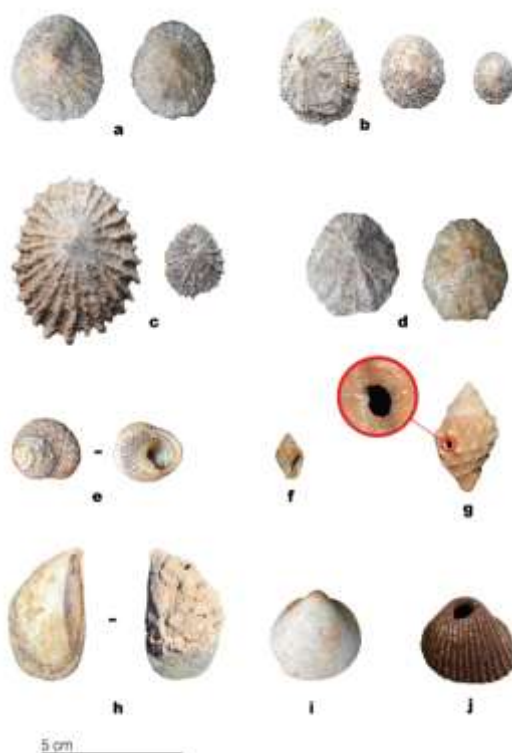
⁴⁸ LUBELL 2005: 210; CAMPS 1974: 92.

⁴⁹ MERZOUG et al. 2022: 101.

VI. THE RELATIONSHIP BETWEEN HUMAN *IBEROMAURUSIAN* AND THE MARINE TERRITORIES

Whenever the region and aquatic environment (continental or marine) is concerned, the examination of prehistoric navigations poses a certain number of methodological issues that must be taken into account⁵⁰. Aquatic remains are collected and studied in archaeological sites. The evidence suggests that, during the *Iberomaurusian* period at the coastal sites, hunter-gatherers used several marine vertebrates and invertebrates. These include bones and otoliths bony fish, calcified vertebrae and teeth of cartilaginous fish like sharks (Abri Alain site)⁵¹. There are also mollusk shells at Taza I site and Columnata. The hard parts of crustaceans, sea urchins, and the bones of marine mammals at places such as anatidae in Abri Alain site⁵² generally indicates that humans introduced these organisms into a land territory.

Iberomaurusian groupes used marine shells at Afalou Bou Rhummel and champlain at Blida⁵³ (Algeria), Ifri el Baroud and Ifri n'Ammar⁵⁴ (Morocco). Archaeological shells contributed both to diet and manufacture, such as making ornaments [FIGURE 7]. Marine mollusks give us access to the environments exploited by these *Iberomaurusian* populations and their movements and their relationship with the sea.



[FIGURE 7]: Mollusc shells from TAZA I. A. *Cymbula safiana*; B. *Patella rustica*; C. *Patella ferruginea*; D. *Patella caerulea*; E. *Phorcus turbinatus*; F. *Columbella rustica*; G. *Stramonita haemastoma*; H. *Mytilus edulis*; I. *Glycymeris nummaria*; J. *Cerastoderma edule*.

MERZOUG et al. 2022: 104, FIG.4

⁵⁰ ONRUBIA-PINTADO 2012: 1.

⁵¹ CAMPMAS et al. 2016: 90.

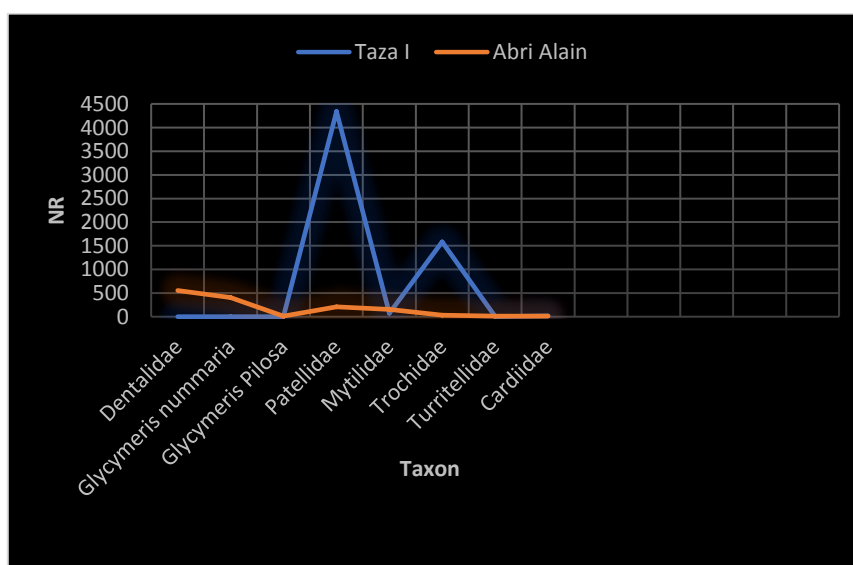
⁵² CHIBANE 2016 : 31

⁵³ BALOUT 1958: 121.

⁵⁴ NAMI 2011: 264.

1. Dietary Behavior of *Iberomaurusian* Humans through Aquatic Remains

The *Iberomaurusian* groups were accustomed to using the resources of the Mediterranean and Atlantic, mainly mollusks, crustaceans and fish. In complementary sites where shellfish constituted a part of the diet, the piles of shells provide us with a great deal of information about the human who occupied them. The piles of shells report sites that were only occupied in certain seasons and usually show evidence of specialized economic activity, such as fishing. «Shells, through the richness of their colors and the brilliance of their pearl, very early on exerted a great attraction for the prehistoric human of North Africa, as elsewhere. *Iberomaurusians* and *Capsians* who mainly fed on the product of their harvest and collecting marine shells, or land snails have obviously sought among these elements of their diet a good part of their objects of ornament»⁵⁵. Sometimes, marine mollusks, some of which served as objects of adornment, are most common; those that were used for food, seen at the Abri Alain site, for instance, are the rarest⁵⁶. The hunting of terrestrial animals leaves several archaeological remains, in the form of animal bones, microlithic tools and weapons, and other technologies. Fishing and related activities leave less. *Iberomaurusian* inhabitants generally had at their disposal territories and aquatic fauna quite comparable to those currently observable. However, fauna was probably exploited differentially depending on fishing and gathering techniques, the individualities of production, consumption and habits, or subsistence behaviors. We can note this in the Taza I and Abri Alain sites [FIGURE 8] according to studies carried out by Campmas and al. in 2016, Merzoug S. in 2017 and Merzoug S. and al. in 2022.



[FIGURE 8]: Graph curves show majorities. Taxa that identified in Taza I and Abri Alain sites
© Done by the researcher.

Shells and shells have helped to understand the activities and behaviors of *Iberomaurusian* groups. Depending on whether man sought the raw material that is the shell or the flesh of the animal, the methods of supply may have varied. The marine shellfish and shell have a privileged place in the daily life of the populations who

⁵⁵ CAMPS-FABRER 1994: 2088.

⁵⁶ PALLARY 1934: 26.

occupied the sites (rock shelters or open-air sites), whether they are coastal or more than 100 km away from the *Iberomaurusian* coastline.

Groups stayed on the coast and hunted mammals, seabirds (anatidae)⁵⁷ and consumed the shells that eventually created the shell middens. Fish certainly constituted the bulk of the diet. We find this type of remains in most coastal sites that indicate human consumption. Among the remains are fish vertebrae or bone pieces, which are numerous at Abri Alain (Alain rockshelter)⁵⁸. Marine taxa in the *Iberomaurusian* sites are labriform, Sparidae which revealed the presence of royal sea bream in Taza I⁵⁹; this indicates that prehistorical humans practiced marine fishing⁶⁰. *Iberomaurusian* flint artifacts are used for marine fishing. They have regular geometric shapes, such as trapezoids and triangles that have refined edges, including those found in (Taza cave, La Mouillah, Abri Alain, Sidi Saïd, Rassel, Taforalt, Temara and Ghar Cahal...). The piece is attached to the end of the stick with a barb for hunting. It is probable that the *Iberomaurusian* used the bone tools for fishing: straight hooks, assegais and harpoons, the latter type is the only fragment of a harpoon with a row of bone barbs collected in level III of Taforalt⁶¹. The bone hooks found in *Iberomaurusian* sites are well made. Fish vertebrae are very often found at coastal sites, indicating that fish were a source of food, along with marine mollusks.

Among the sources of food for the humans in the coastal region are marine mollusks that one can pick up from the sea and ocean, and other shellfish. Through this type of activity, one can identify an aspect of food selection during the *Iberomaurusian* in the coastal areas of the Mediterranean and Atlantic. Among the species that have been consumed by *Iberomaurusian* humans are Mytilidae, Patellidae, Trochidae, which are found in a rocky biotope in the intertidal zone. They were probably collected at low tide⁶², making them easy to locate and collect on emerged rocky substrates. These families are represented in the Mediterranean (Abri Alain, Taza, Tamar Hat, Afalou Bou Rhummel). Similarly, they are found on the Moroccan Atlantic coasts (Temara-Rabat) which is defined as the Middle Stone Age in North Africa⁶³. Likewise for Patellidae which are widespread in the *Iberomaurusian* sites of the Mediterranean coast⁶⁴, for example at Rassel site C. Brahimy in 1970 noted the presence of Trochidae and Patellidae which are in the Babors region, such as Afalou Bou Rhummel, Tamar Hat and Taza I cave and in the Oranais region too (Abri Alain)⁶⁵. According to P. BARBIN in 1910, there are *Cypraea lurida* shells that were extracted in 1907 in La Mouillah, which was discovered in 1899 by P. PALLARY⁶⁶. Mytilidae, Patellidae, Trochidae are found at

⁵⁷ CAMPMAS et al. 2016: 97.

⁵⁸ CAMPS 1974: 94; CAMPMAS et al. 2016: 11.

⁵⁹ MERZOUG et al. 2022: 102.

⁶⁰ CAMPS 1998: 83.

⁶¹ CAMPS 1974: 67.

⁶² CAMPS 1974: 94; CAMPMAS et al. 2016: 91.

⁶³ STEELE & ALVAREZ-FERNANDEZ 2011-2012; CAMPMAS et al. 2016: 97

⁶⁴ CAMPS FABRER 1994: 02.

⁶⁵ ARAMBOURG et al. 1934; SAXON et al. 1974 ; CAMPMAS et al. 2016: 93; MERZOUG 2017: 197; MERZOUG et al. 2022: 99.

⁶⁶ BALOUT 1958: 113.

Temara in the Moroccan Atlantic (la grotte des Contrebandiers). The *Iberomaurusian* groups mainly ate Mytilidae and Patellidae, but also to a lesser extent Trochidae and Muricidae⁶⁷. With regard to mollusks, Arambourg noticed a difference in the consumption of their strains. For example, in the upper stratigraphic level of the Afalou Bou Rhummel and Tamar Hat sites, he noticed a large spread of marine shells compared to the lower level with upper level⁶⁸.

Archaeological and ethnographic data indicate that the first species caught or collected were probably accessible at the waterline or slightly below, without requiring large technical investments: hand fishing or use of knives made of stone, bladelets or hooks sufficed. The notches on the Patellidae shells indicated that they were adapted to be tools, which would allow one to slide between the shell and the rock to detach a mollusk from the rocky substratum⁶⁹. In this way, the collection of coastal invertebrates is attested in the *Iberomaurusian* levels of North Africa.

It is noted that the exploitation of other fishing resources by the *Iberomaurusian* inhabitants are crustaceans, and Crab clips (Afalou Bou Rhummel and Taza I cave)⁷⁰. Also, the human groups of this period exploited sea urchins at Abri Alain, Taza I⁷¹ and Rachgoun⁷². There are some fishing resources not identified in the ancient assemblage, including (Aterian and Mousterian), *Haliotis* (Contrebandiers site)⁷³ and (Dar es Soltane site)⁷⁴. Also, the crab claws were found in the *Iberomaurusian*, but not in the oldest assemblage, despite the robustness of these fossils. It was found in the most recent material from the Haua Fteah site too, but not in Late Pleistocene material⁷⁵.

Apparently, Invertebrates and Crustaceans are not the main food of the *Iberomaurusian* groups, but were supplements to the meat they got from the animals they hunted. *Iberomaurusian* groups have also collected marine shells or mollusks for other uses such as body adornment.

Body Adornment Marine Remains

Iberomaurusian human groups mainly feasted on their harvest and collected marine shells and fish⁷⁶. They also used marine shells as body adornment [FIGURE 9], [FIGURE 10]. Many *Iberomaurusian* sites suggest that marine mollusks were used as body adornments along the Atlantic coast (Temara, Bouskoura, El Khenzira, Dar es Soltane) and the Mediterranean coast, including sites such as Rachgoun, Rassel, Tamar Hat, Afalou Bou Rhummel, Taza, and Ouchtata.

Marine shells were an important feature in the spiritual life of *Iberomaurusian* inhabitants, and were used as symbolic expression. For example at La Mouillah site, the *Cypraea Lurida* seemed to have been burned, and the human skeletons discovered in a

⁶⁷ CAMPMAS et al. 2016: 96.

⁶⁸ CAMPS 1974: 93.

⁶⁹ CAMPMAS et al. 2016: 91.

⁷⁰ MERZOUG et al. 2022: 109.

⁷¹ CAMPMAS et al. 2016: 91.

⁷² CAMPS 1974: 94.

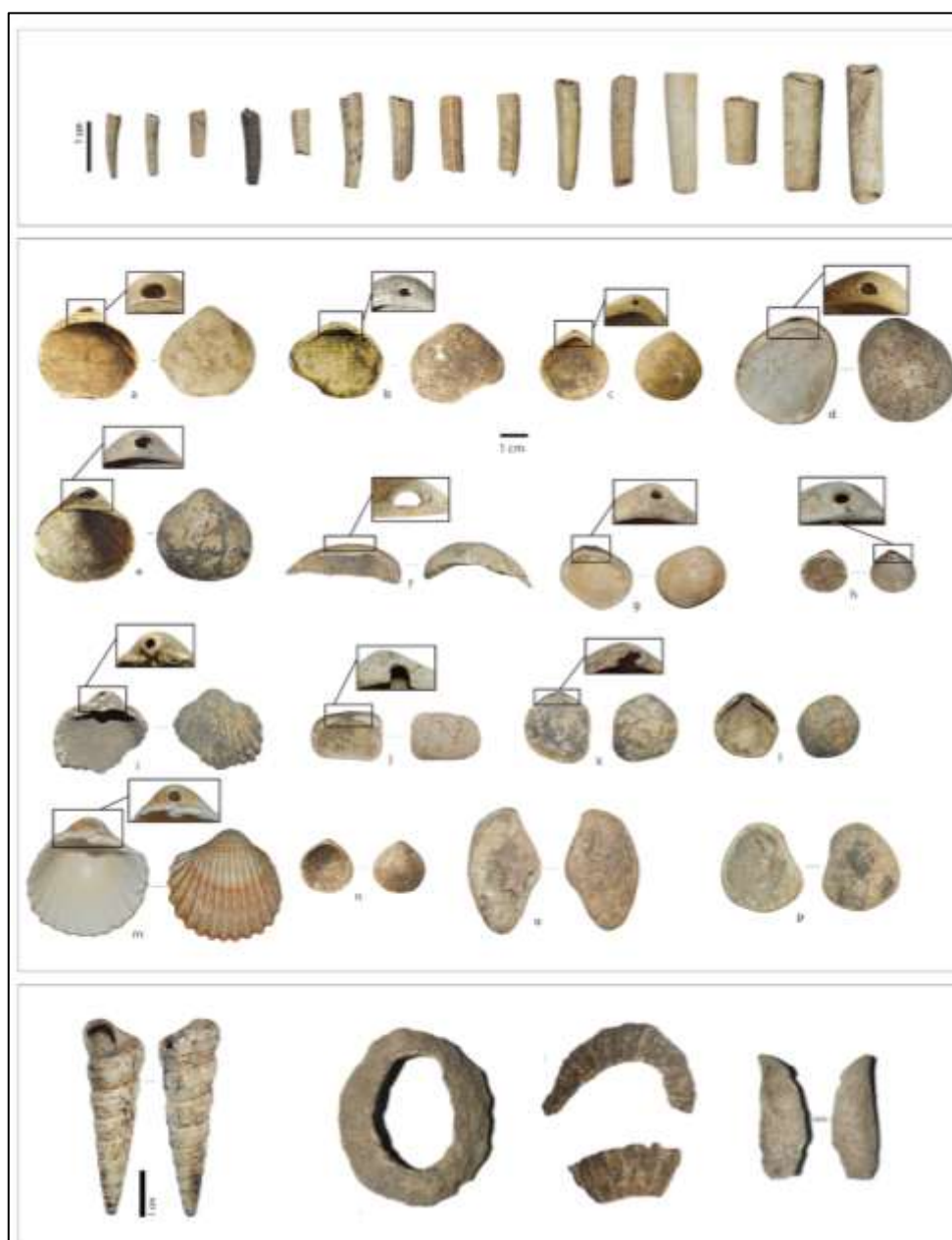
⁷³ STEELE & ALVAREZ-FERNANDEZ 2012: 225

⁷⁴ RUHLMANN 1951: 33

⁷⁵ STEELE & ALVAREZ-FERNANDEZ 2012: 225

⁷⁶ CAMPS-FABRER 1994: 2088.

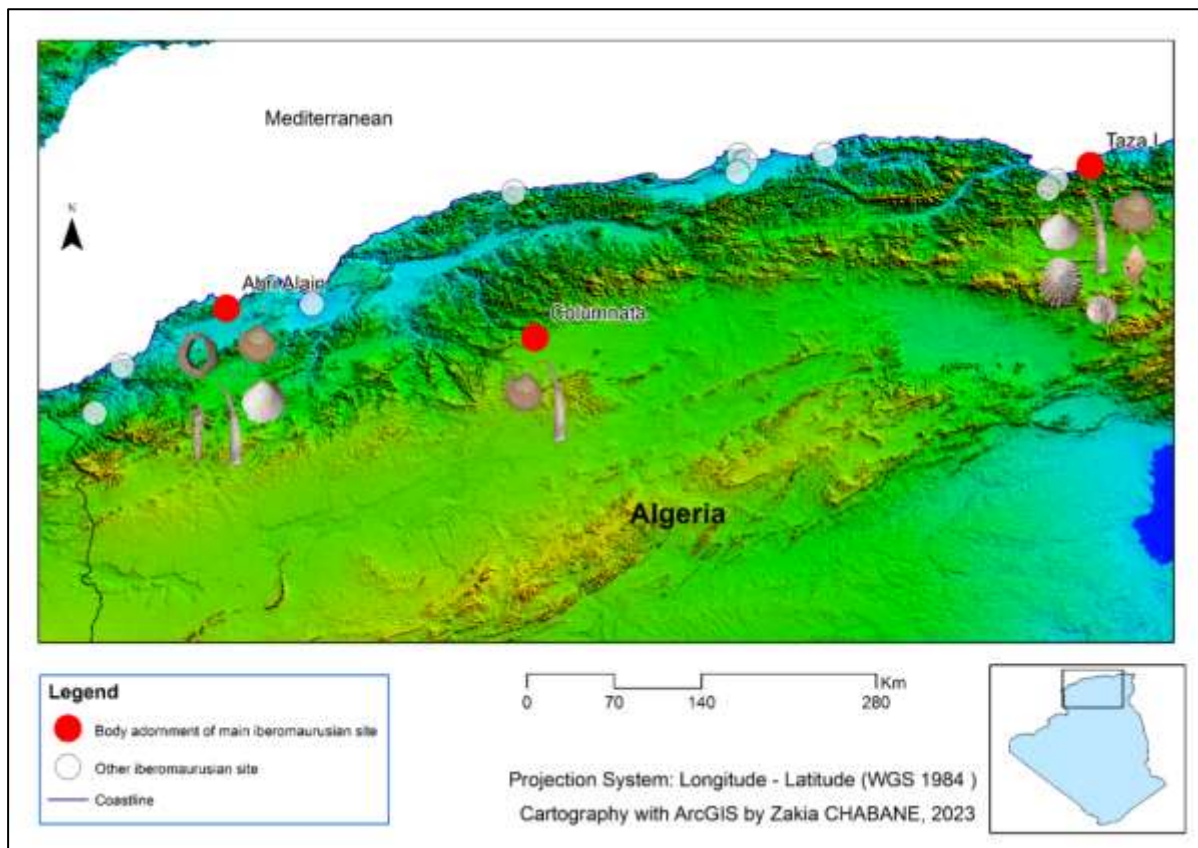
rock shelter there was found wearing a marine shell of this type as a necklace. The *Iberomaurusian* people at Abri Alain in the Oranean and Taza I in the Babors region adorned themselves with shells, primarily using tusk shells (Dentaliidae), Glycymerididae, Cardiidae, and Turritellidae, all of which are still commonly found in the Mediterranean Sea. At Taforalt, the majority of the marine shells that were used for bodily adornment were sea scallop, turrets, and dentales⁷⁷. Among the scaphopods, tusk-shell (Dentaliidae) are very common at the *Iberomaurusian* sites in the Maghreb, and are especially common during the Neolithic era⁷⁸. Marine and land mollusks of various types have been used by humans since the *Iberomaurusian* period at coastal sites. Even to this day, in this region, people use them to adorn their bodies.



[FIGURE 9]: Marine shells as body adornment. CAMPMAS et al. 2016: 92, 94-95.
Modified by the researcher.

⁷⁷ CAMPS 1974: 94.

⁷⁸ CAMPS-FABRER 1994: 2088.



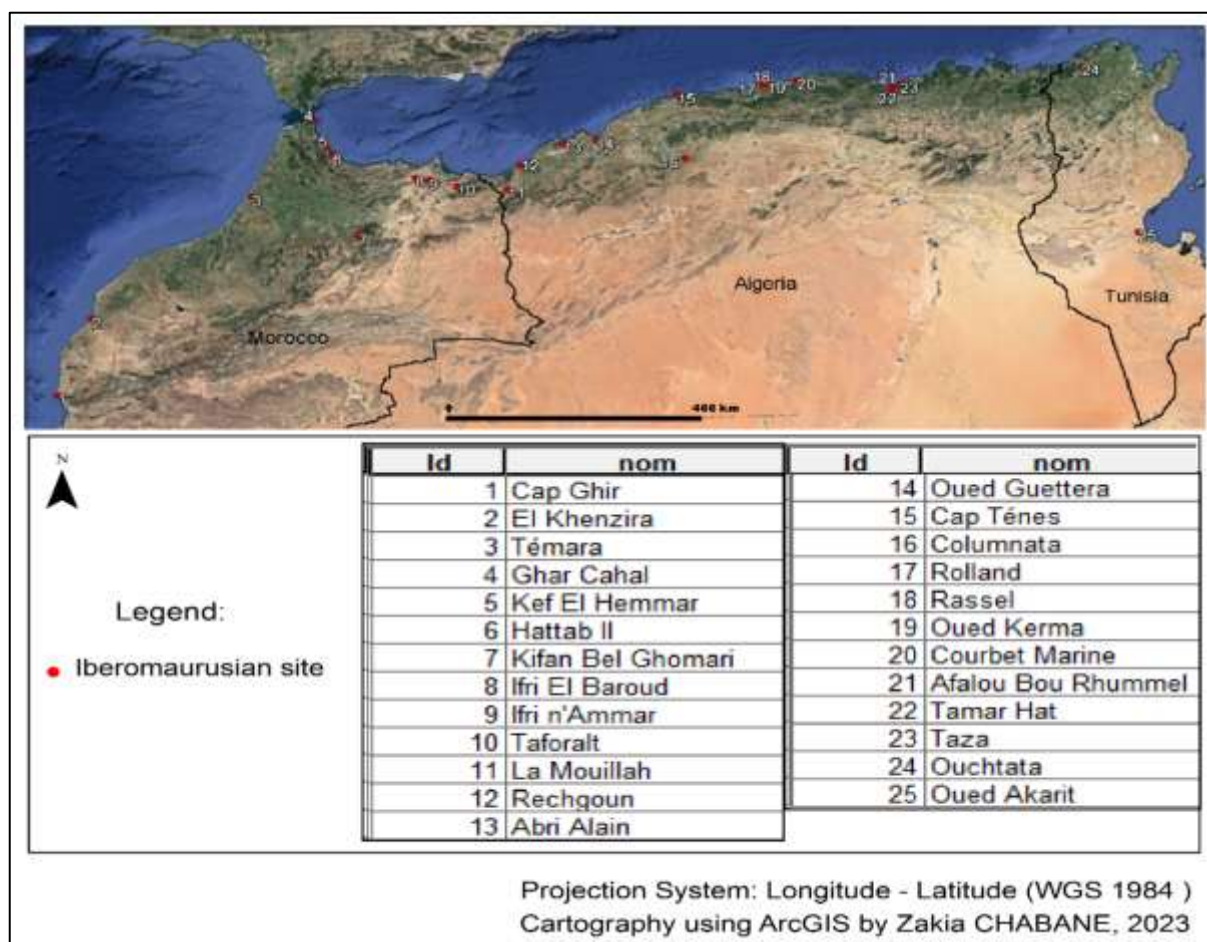
[FIGURE 10]: The majority species identified according to their uses/body adornment in the main *Iberomaurusian* sites © Done by the researcher

2. The Marine Territory of the *Iberomaurusian* Fisherman

A coastal territory is an area defined as an ecotone, or a region of transition between two terrestrial and marine biomes⁷⁹. The *Iberomaurusian* culture spread throughout all of the coastal regions of the Maghreb, starting from the Libyan coast in the east to the Atlantic Ocean in the west. The specific regions include Libya, Tunisia, Algeria and Morocco, with the exception of the eastern Tunisian coast, because the geological formations dating back to this period are currently submerged under the Mediterranean Sea, several kilometers off the current coastline, which is particularly low⁸⁰. This culture also extends to inland regions such as the high plateau (Hauts Plateaux) in Algeria and the middle Atlas in Morocco [FIGURE 11].

⁷⁹ BAILEY & PAKINGTON 1988: 1-6.

⁸⁰ CAMPS 1974: 61-62.



[FIGURE 11]: Geographical localization of main coastal *Iberomaurusian* sites that represented on Satellite Image © Done by the researcher

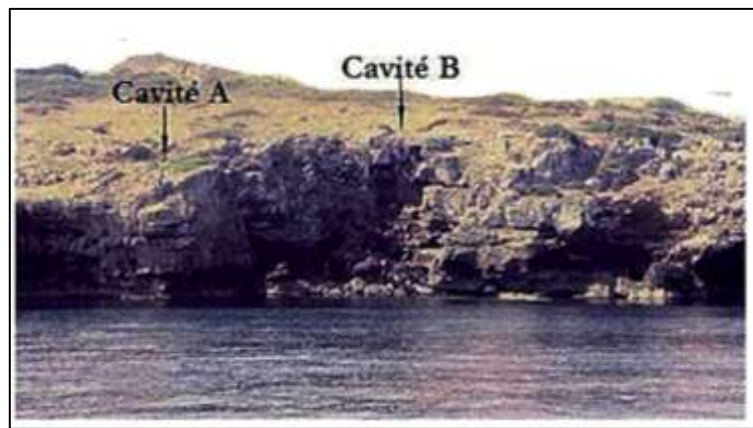
The coastal zone was an important territory during the *Iberomaurusian* period when hunting and fishing were the main activities. The proximity of the aquatic territory with the land makes it more easily accessible by humans and can contain various substrates: rocky, sandy or sludgy. Each marine organism is dependent on a type of substrate. By cross-referencing data on archaeological taxa habitats with the specific geomorphological conditions to each region, we can determine the exploited coastlines, evaluate the distances covered to procure resources, and understand how populations strategized to collect such resources.

We took as a case of study the Algerian *Iberomaurusian* sites that cover this period and which effectively demonstrated the relationship between the *Iberomaurusian* human and the marine territories. We tried to use site catchment analysis, which is used to study ancient hunter-gatherer mobility and subsistence. Researchers conducted experimental studies to test the theory of site catchment analysis, focusing particularly on how human groups move around sites of activity. They concluded that moving in an uninhabited area requires great effort. In order to procure natural resources that are necessary for living, populations needed to be able to exploit neighboring areas, especially when they reached the point of sufficiency⁸¹. In most of the cases studied, the distances walked was less than 10 km.

⁸¹ CHISHOLM 1968: 131; LEE 1969: 61.

We applied the buffer methods with ArcGIS into 03 main *Iberomaurusian* sites as a model in this study (Taza I, Abri Alain and Columnata) and other sites of this period. As a result, we conclude two groups of sites, the first group is near the coastline and the second groupe is far from the coastline. Sites close to the sea for example, Sidi Saïd, in Algeria was partly submerged in the sea [FIGURE 12], along with Temara, Morocco. There were also sites that were distant from the maritime territories. It seems that the *Iberomaurusian* inhabited the area along the seashore, less than 500 m away. Such areas of inhabitation include Taza I cave of Jijel (Algeria) and Kef El Hemmar (Morocco). These populations consumed the fish and marine mollusks, and collected marine shells from rocky substrates near the site. Additionally, the Abri Alain rock shelter of Oran is located in a wetland less than 5 km from the seashore. The Oranean region is considered to be one of the oldest regions where prehistoric people used maritime navigation⁸². The same distances are noted between sites and the coast in Morocco, such as Hattab II site, Cap Ghir site, El Khenzira and Temara in Moroccan Atlantic. The *Iberomaurusian* human settlement was primarily concentrated along the coastline, influenced significantly by the availability of key natural resources, particularly those related to nutrition. There is distance between the settlement location and these vital resources.

Iberomaurusian human groups who frequented habitats located near the sea were familiar the marine world, which is clear according to the archaeological remains found in the sites. It is obvious that aquatic fauna was an integral part of the diet and daily life of the *Iberomaurusian*.



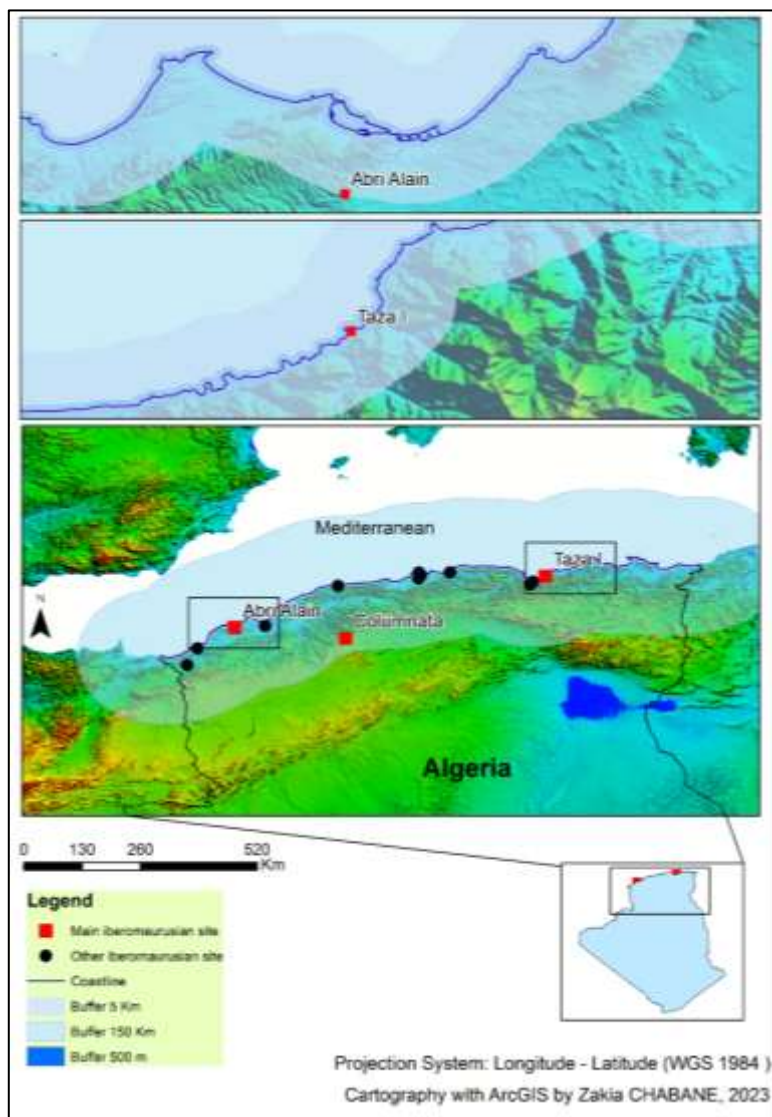
[FIGURE 12]: The aterian/ *Iberomaurusian* Sidi Saïd site. BERTROUNI 2021: FIG.8

The exploitation of marine fish and shells are evidenced in the inland territories through the remains of marine mollusks found at Columnata. Rare dentalium shells and cardium valeves that are pierced with suspension holes indicate possible interaction with inhabitants of the coastal areas⁸³. The buffer shows a distance less than 150 km from the coastline [FIGURE 13], which indicates that the *Iberomaurusian* exploited the maritime environment in this site. Furthermore, this population used inland fish and mollusks, whereas in the inland sites, they only transported mollusks. As we have seen, they more systematically exploited nearby territories, rivers and lakes. However,

⁸² CAMPS 1974: 275.

⁸³ SARI 2023: 74.

southern populations, (Hauts Plateaux) also sometimes exploited coastal resources (Columnata site in Algeria and Kifan Bel Ghomari in Morocco), despite their distance. Examination of the faunal remains revealed less exploitation of these resources for consumption. On the other hand, this supply, which were mostly mollusks, seems to have served other purposes, such as the production of ornaments and utility objects. In other words, the way these remote territories exploited marine fauna was not to meet daily needs, but seems to be more selective.

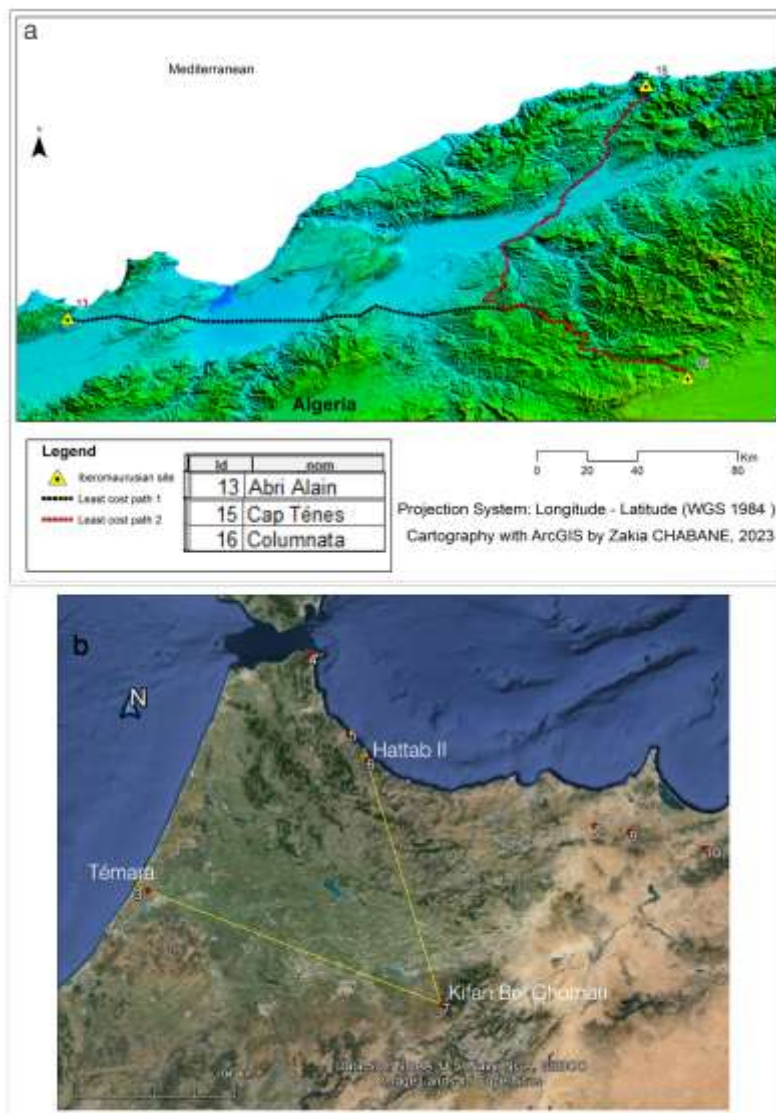


[FIGURE 13]: Application of a buffer with SRTM into main *Iberomaursian* coastal sites and marine territories of Algeria © Done by the researcher

Probably, links between these *Iberomaursian* sites allowed natural resources such as marine mollusks to be transported. The accessibility of sites is a determining criterion, and calculating the average of the two least-cost distances between two locations, measures the number of paths that served these human settlements⁸⁴. This allows for the analysis of exchange networks and circulation paths between archaeological sites. As a result, we apply, in this case, «least-cost analysis», to reconstruct possible ancient paths between sites of human activity and sites catchments

⁸⁴ HERZOG 2014: 226-227.

(molluscs resources) in west Algeria. Three *Iberomaurusian* sites (Columnata, Abri Alain, and Cap Ténès) were selected as proxies to delineate the least-cost paths for the movements toward natural sources of marine fish and mollusks [FIGURE 14/A]. Then, the least-cost path 1 is between Abri Alain and Columnata site, with a distance of 180 km; the *Iberomaurusian* would have walked more than 36 hours to take raw material or natural resource. The least-cost path 2 is between cap Ténès site and Columnata site, or a distance of 207 km, which is the equivalent of a 41 hours walk. The distance between the coastline to Columnata is 118 km. In Morocco, from the distance between the Mediterranean coastline to Kifan Bel Ghomari, which is situated in eastern Morocco at foothills of the middle Atlas⁸⁵, is 163 km (Kifan Bel Ghomari to Hattab II). From the Atlantic to Kifan Bel Gohmari, the distance is more than 206 km (Kifan Bel Ghomari to Temara) [FIGURE 14/b]. The surrounding area of the catchment base in Kifan Bel Ghomari site is larger than at Columnata. On average, a prehistoric human could only walk 10 km a day. To move to the sea the human needs other encampments, which means there are probably others sites in these regions.



[FIGURE 14]: The accessibility of sites and mobility © Done by the researcher

⁸⁵ ROUBET & HACHI 2005: 1.

VII. CONCLUSION

The study of *Iberomaurusian*'s relationship with the marine world proves interesting. This study suggests that there was a critical juncture for *Iberomaurusian* humans, wherein they needed to break away from their inland territory and explore a previously unfamiliar marine environment. Food was acquired through hunting and gathering. *Iberomaurusian* humans also liked to collect shellfish, and probably fished. Archaeological remains indicate that both marine and terrestrial food resources are exploited.

The marine remains were primarily across the coastline and extended inland (more than 200 Km from the coastline), with marine shells being found at Columnata, in the Tiaret's Mountains (Algeria) and at Kifan Bel Ghomari (Morocco). Aquatic or marine resources, however, remain a small portion of the fauna exploited, even when compared to the terrestrial resources, particularly mammals. The evidence suggests that, during the *Iberomaurusian*, hunter-gatherers at the coastal sites used several marine vertebrates (fish and seabirds) and invertebrates (marine mollusks) as subsistence. However at sites far away from the Atlantic and Mediterranean coast, hunter-gatherers only carried marine mollusks such as dentaliidae.

It's plausible that the *Iberomaurusian* people occupied open-air sites instead of rock shelters, unlike the Aterian culture, and migrated closer to the coastline. This trend is evident not only in the Temara area, which is currently submerged in the Moroccan Atlantic, but also in regions of Algeria and Tunisia. Verification of this hypothesis would require the development of underwater archaeological techniques to explore submerged sites. It is necessary to do inventories, surveys, and explorations of submerged prehistoric sites, particularly of the *Iberomaurusian* sites off the coasts of North Africa. This effort allows us to understand human's behavior in their environment, and highlights the importance of underwater archaeological heritage.

BIBLIOGRAPHY

- ALVAREZ-FERNANDEZ, E. : L'exploitation des ressources marines au Paléolithique moyen et supérieur initial en Europe: synthèse des données disponibles, in White R., Bourrillon R. (dir.) avec la collaboration de Bon F., Aurignacian Genius : art, technologie et société des premiers hommes modernes en Europe, Actes du symposium international, 8-10 avril 2013, 7, New York University, 2015, 191-209.
- AOURAGHE, H. : «Histoire du peuplement paléolithique de l'Afrique du nord et dynamique des interactions entre l'homme et son environnement», *Palevol* 5, 2006, 237-242.
- ARAMBOURG, C., BOULE, M., VALLOIS, H. & VERNEAU, R.: «Les grottes paléolithiques des Beni Ségoual (Algérie)», *Archives de l'Institut de Paléontologie Humaine*, N°13, 1934.
- BAILEY, G. & PAKINGTON, J.: *The Archaeology of Prehistoric coastlines*, Cambridge (Cambridge University Press)1988.
- BALOUT, L.: *Algérie préhistorique*, (ed.): *Arts et métiers graphiques*, Paris, 1958.
- BALOUT, L.: *Préhistoire de l'Afrique du Nord, Essai de chronologie*, (ed.), *Arts et métiers graphiques*, Paris, 1955.
- BARICH, B.E., GARCEA, E.A.A. & GIRAUDI, C.: «Between the Mediterranean and the Sahara: Geoarchaeological Reconnaissance in the Jebel Gharbi», *Antiquity, Libya* 80, 2006, 567-582.
- BARTON, R.N.E., BOUZOUGGAR, A., COLLCUTT, S.N., GALE, R., HIGHAM, T.F.G., HUMPHERY, L.T., PARFITT, S., RHODES, E., STRINGER C.B. & MALEK, F.: «The Late Upper Paleolithic Occupation of the Moroccan Northwest Maghreb during the Last Glacial Maximum», *African Archaeological review* 22/2, 2005, 77-100.
- BEN-NCER, A.: «Etude de la sépulture ibéromaurusienne 1 d'Ifri n'Baroud (Rif oriental, Maroc)», *Anthropo* 7, 2004, 177-185.
- BETROUNI M.: «Le gisement préhistorique de Sidi Saïd Tipasa, Algérie du temps vide au temps plein», 2021, hal-031026413.
- BRAHIMI, C.: L'ibéromaurusien littoral de la région d'Alger, vol.13, Alger (Arts et métiers graphiques)1968.
- CAMPAS, E., CHAKROUN, A. & MERZOUG, S.: «Preliminary Data on the Exploitation of Marine Malacofauna by the Iberomaurusian Groups of the Abri Alain Rock Shelter (Oran, Algeria)», *PALEO* 27, 2016, 83-104.
- CAMPS, G.: *Les civilisations préhistoriques de l'Afrique du Nord et du Sahara*, Doin, Paris, 1974.
- CAMPS, G.: «L'homme préhistorique et la mer», Comité des travaux historiques et scientifiques, Actes du 120^{ème} Congrès national des Sociétés savantes, Aix-en-Provence 1995, 1998, in: Gaucher Gilles. G. Camps, «L'Homme préhistorique et la mer», in: *Bulletin de la Société préhistorique française* 96/1, 1999, 83-84
- CAMPS-FABRER, H.: «Parures des temps préhistoriques en Afrique du Nord», *Libyca* 8, Anthropology-Prehistory-Ethnography, 1960, 9-218.
- CAMPS-FABRER, H.: «Coquillages», *Encyclopédie berbère*, N°14, 1994, 2088-2092.
- CHABANE, Z.: «The Analysis of Prehistoric and Protohistoric Settlement of the Tiaret's Mountains region using GIS», *Historical Researches Journal* 2, 2022, 923-961
- CHABANE, Z.: «Morphotechnological Study Stone Artifacts of Taza I .Lower level-Jijel-Algeria», Ma Thesis, Institute of Archaeology/University of Algiers, 2012.
- CHAMLA M.-C., DASTUGUE, J. & CAMPS-FABRER, H.: «Columnata», *Encyclopédie Berbère*, 1994, 1-16.
- CHIBANE, S.: «Étude taphonomique et archéozoologique de la faune ibéromaurusienne de l'abri Alain (Oran, Algérie)» Ma thesis, Département Histoire de l'Art et Archéologie /Université Toulouse Jean Jaurès, 2016.
- CHISHOLM, M.: *Rural settlement and land use: An essay in location*, Hutchinson (Michigan University) 1968.
- CLOSE, A.E.: « Current Research and Recent Radiocarbon Dates from Northern Africa II», *the Journal of African History* 25/1, 1984, 1-24.
- CLOSE, A.E.: «Current research and récent radiocarbon dates from Northern Africa », *the Journal of African history* 21/2, 1980, 145-167.
- DEBENATH, A.: «Le peuplement préhistorique du Maroc: données récentes et problèmes», *L'Anthropologie*, 104, 2000, 133-145.

- DERRADJI, A.: *Algérie, deux million d'années d'Histoire: les premiers Habitants*, Djazaïr (année de l'Algérie en France) 2003.
- GOBERT, E.J.: «Capsien et Ibéromaurusien», *Libyca* 2, Anthropology-Prehistoire-Ethnography, 1945, 441-452.
- HACHI, S.: *Les cultures de l'homme de mechta-Afalou: Le gisement d'Afalou Bou Rhummel (massif des Bâbords, Algérie)*, N°2, Alger (C.N.R.P.H.) 2003.
- HACHI, S.: «Du comportement symbolique des derniers chasseurs Mechta-Afalou d'Afrique du Nord», *Comptes Rendus Palevol* 5/1-2, 2006, 430-440.
- HADJOUIS, D.: «Les hommes du paléolithique supérieur d'Afalou Bou Rhummel (Bejaia, Algérie). Interprétation nouvelle des cinétiques cranio-faciales et des effets de l'avulsion dentaire. Malformation crâniennes, Troubles de la croissance, anomalies et maladies alvéolo-dentaire», *Anthropologie* 106/3 2002, 337-375.
- HADJOUIS, D.: *Algérie, Deux millions d'années d'histoire: Aux origines d'homo. Sapiens*, Catalogue d'exposition, Années de l'Algérie en France, 2003.
- HERZOG, I.: «A Review of Case Studies in Archaeological Least-Cost Analysis», *Archeologia e Calcolatori* 25, 2014, 223-239
- IRISH, J.D.: «The Iberomaurusian Enigma: North African Progenitor or Dead End?», *Journal of Human evolution* 39, 2000, 393-410.
- LEER, B.: *Kung Bushman Subsistence: An Input-Output Analysis*, Environment and Cultural Behavior, A.P. Vayda, Grdan City, N.Y. (Natural History Press) 1969, 47-79
- LINSTÄDTER, J.: «The Epipalaeolithic-Neolithic-Transition in the Mediterranean region of Northwest Africa», *Quartär* 55, 2008, 41-62
- LUBELL, D.: «Late Pleistocene-Early Holocene Maghreb», in *Encyclopedia of Prehistory*, vol.I, Kluwer Academic, New York (Plenum Publishers) 2001, 129-149.
- LUBELL, D.: «Prehistory Edible Land Snails in the Circum-mediterranean: the Archaeological Evidence», *Petits Animaux Et Sociétés Humaines. Du Complément Alimentaire Aux Ressources Utilitaires*, XXIV rencontres internationales d'archéologie et d'histoire d'Antibes, Sous la direction de J.-P. BRUGAL & J. DESSE, (ed.) APDCA, Antibes, 2004, 77-98.
- LUBELL, D.: Continuité et changement dans l'Epipaléolithique du Maghreb, edited by SAHNOUNI, M., *Le Paléolithique en Afrique: l'histoire la plus longue*, Guide de la Préhistoire Mondiale, Artcom'/Errance, Paris, 2005, 205-225.
- MERZOUG, S.: «Subsistence Behaviors in Northwest Africa During the Late Pleistocene/Holocene transition: Between Homogeneity and Strategic Variations», *L'anthropologie* 121, 2017, 189-203.
- MERZOUG, S., MEDIG, M., DERRADJI A. & REMINI F.: «The Exploitation of Halieutic Resources Among the Iberomaurusian Populations of the Babors Region (Upper Paleolithic, Algeria): Contribution of the Taza 1 Site», *PALEO*, Colloque hommage à Émilie Campmas (1983-2019), Sociétés humaines et environnements dans la zone circumméditerranéenne du Pléistocène au début de l'Holocène, (ed.) Musée national de Préhistoire, 2022, 98-111.
- NAMI, M.: «L'Ibéromaurusien du Rif oriental (Maroc): Cas d'Ifri el Baroud et d'Ifri n'Ammar», in: Actes du colloque international «Préhistoire maghrébine», Tamarasset, 5-7 novembre 2007, Travaux du CNRPAH, Nouvelle série, N°11, 2011, 249-265.
- NESPOULET, R. & EL HAJRAOUI, A.: *Mission Archéologique El Harhoura-Témara*, Rapport d'activités, Rabat, 2004.
- ONRUBIA-PINTADO, J.: «Navigation: Préhistoire», *Encyclopédie Berbère*, N°33, 1-5, (Peeters Publishers) 2012.
- PALLARY, P.: *l'Abri Alain près d'Oran (Algérie)*, Mém.12, Paris (MASSON) 1934.
- ROCHE, M.J.: *L'Epipaléolithique marocain*, vols.1-2, Lisbon (Fondation Calouste Gulbenkian) 1963.
- RODRIGUE, A.: «Note sur l'Epipaléolithique du Haouz (Provence de Marrakech)-Maroc», *Bulletin de la Société préhistorique française* 91/3, 1994, 209-210.
- ROOD, R.J.: «Spatial Analysis in Archaeology: Historical Developments and Modern Applications», *Lambda Alpha Journal of Man* 14, 1982, 25-60.
- ROUBET, C. & HACHI, S.: «Kifan Bel-Ghomari», *Encyclopédie berbère* N° 27, (Peeters Publishers) 2005, 1-6.

- RUHLMANN, A. & INSTITUT DES HAUTES-ETUDES MAROCAINES: *La grotte préhistorique de Dar es Soltane. Hespéris*, Paris (Larose) 1951.
- SARI, L.: «Columnata, Algeria», in *Handbook of Pleistocene Archaeology of Africa*, 2023, 65-77.
- SAVAGE, S.H.: *Modelling the Late Archaic Social Landscape*, in: *Interpreting space: GIS and archaeology*, 26, edited by ALLEN, K.M.S., GREEN, S.W. & ZUBROW, London, New York & Philadelphia (Taylor & Francis) 1991, 330-355.
- SAXON, E.C., CLOSE, A., CLUZEL, C., MORSE, V. & SHACKELTON, N.J.: «Results of Recent Investigations at Tamar Hat», *Libyca* 22, 1974, 49-91.
- SCHURMANS, U., HAROLD, D. & EL HADJRAOUI, M.A.: *Grotte des contrebandiers, Témara, Rapport d'opérations pour l'année*, Rabat, 2006.
- STEELE, T. & ALVAREZ-FERNANDEZ, E.: *Initial Investigations into the Exploitation of Coastal Resources in North Africa During the Late Pleistocene at Grotte des Contrebandiers, Morocco*, edited by BICHO N.F., HAWS J. A. & DAVIS L.A., *Trekking the Shore: Changing Coaslines and the Antiquity of Coastal Settlement*, New York (Springer) 2011, 383-403.
- STEELE, T. & ALVAREZ-FERNANDEZ, E.: *Restes de Mollusques marins*, edited by EL HAJRAOUI A.M., NESPOULET, R., DEBENATH, A. & DIBBLE, H.L.: *La préhistoire de la Région de Rabat-Témara*, vol.3, Ville et sites Archéologiques du Maroc (Institut National des Sciences de l'Archéologie et du Patrimoine) 2012, 223-227
- STRAUS, L.G.: «Africa and Iberia in the Pleistocene», *Quaternary International* 75/1, 2001, 91-102.
- TIXIER, J.: *Typologie de l'Épipaléolithique du Maghreb*, edited by CRAPE, Mém.2, California (Arts et métiers graphiques) 1963.
- VERMEERSCH, P.M., PAULISSEN, E. & VAN PEER, P.: «Le Paleolithique de la vallée du Nil égyptien», *L'Anthropologie* 94/3, 1990, 435-458.
- VITA-FINZI & HIGGS, E. et al: «Prehistoric Economy in the Mount Carmel Area of Palestine: Site Catchment Analysis», *Proceedings of the Prehistoric Society* 36, 1970 1-37.